

Modern Packaging

DECEMBER • 1943



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GO, ILL.
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WHY THE PC BOAT CHANGED ITS COURSE

THE lookout on the PC boat stared again at the twinkling midnight sky.

"Must have been a falling star," he said half-aloud.

But, as he watched, a far-away point of light—red this time—rose above the horizon, lingered briefly . . . and disappeared.

The lookout clutched his telephone. "Bow lookout to bridge: Distress signal 3 points off the port bow, sir."

Seconds later, the PC boat swerved sharply and churned to the rescue.

The light which this sailor spotted is called a Very signal. Twelve signal cartridges—red—green—white—together with a hand projector are packed in a six-inch, air-tight can—a Canco container which has frequently meant rescue to the crews of foundering ships . . . a

chance to fight again on the high seas.

To cans for Very Signals, add . . .

. . . complete torpedoes . . . fuse containers . . . demolition kits . . . hand grenades . . . containers for blood-plasma transfusion kits . . . first-aid kits . . . emergency field rations . . . and a host of other vital war products—all made by Canco.

In addition, Canco machine shops are devoting the greater part of their time to the production of specified basic machine tools for other war needs.

At the same time, the amount of food packed for the Army and Navy and the home front shows no signs of slackening. Indeed, last year more food was packed in cans than ever before.

These are some reasons why it was necessary to drop certain can sizes and why metal containers are no longer avail-

able for numerous consumer products.

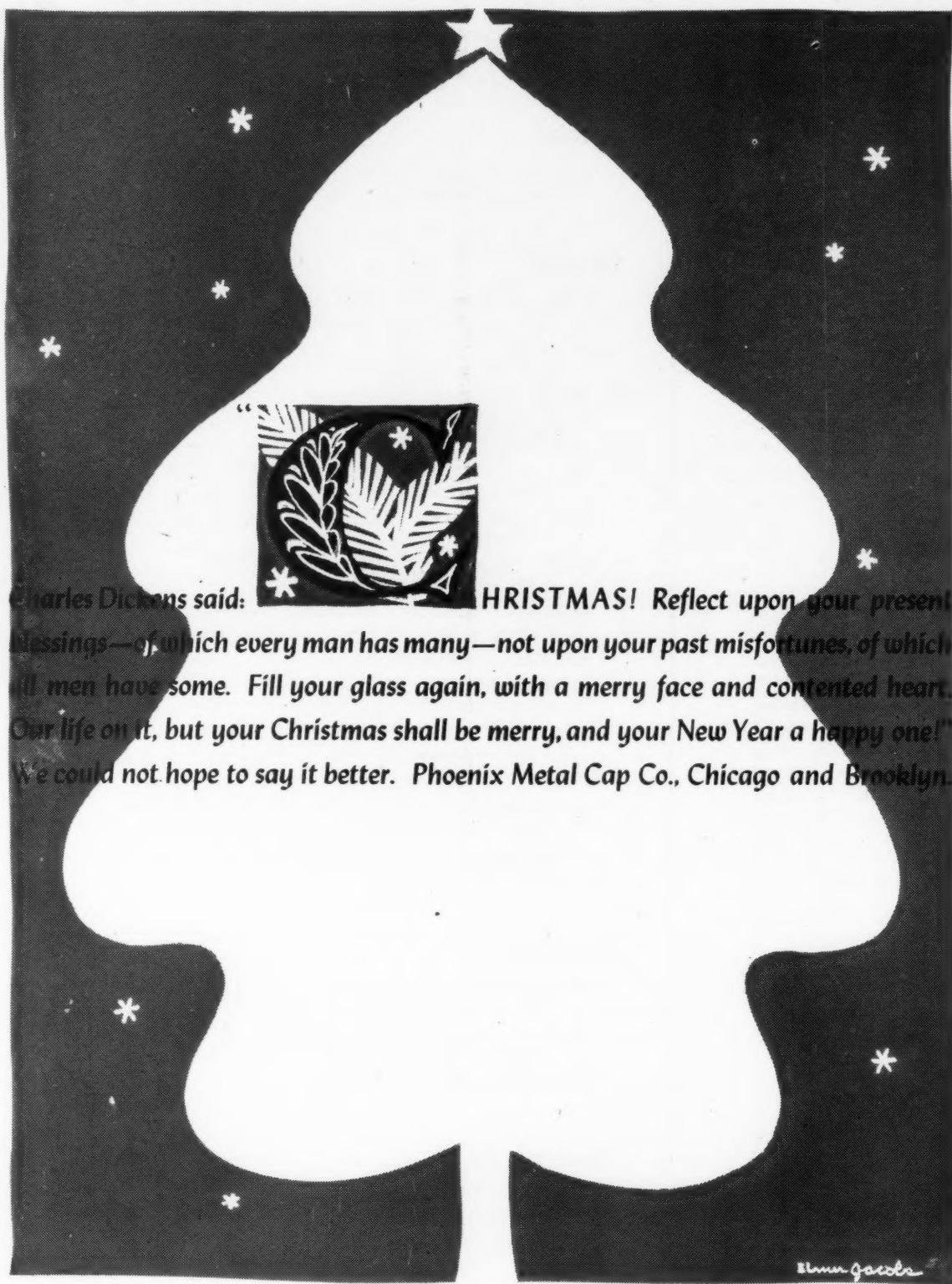
Please understand, however, that this company is doing everything possible to "stretch" its metal supplies and to develop suitable substitute containers wherever possible.

AMERICAN CAN COMPANY
230 PARK AVENUE, NEW YORK 17, N. Y.



CONTRIBUTE YOUR BLOOD TO THE RED CROSS

As you read this advertisement—stop and think—your blood could save the life of a wounded American soldier! If you live in or near one of the 33 cities in which blood-donor centers are located, call and make an appointment.



Charles Dickens said: CHRISTMAS! Reflect upon your present blessings—of which every man has many—not upon your past misfortunes, of which all men have some. Fill your glass again, with a merry face and contented heart. Our life on it, but your Christmas shall be merry, and your New Year a happy one! We could not hope to say it better. Phoenix Metal Cap Co., Chicago and Brooklyn.

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Modern Packaging

VOLUME 17

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NUMBER 4

SARAN

Last July MODERN PACKAGING presented a preliminary article on Saran film, telling something of the properties and war uses of this important new material. In this issue appears the first complete laboratory report, with charts, tables and summaries of the recognized testing methods telling exactly what may be expected of Saran in postwar packaging. The article, by two of the scientists who have been most closely associated with Saran's development, starts on page 95.

This month's cover

Hundreds of volunteers like those in the photo, most of whom have sons and husbands in service, packed 55,000 Christmas packages for men overseas at the Central Red Cross Chapter of Queens, Jamaica, L.I. Cartons holding 72 packages were lined with waterproof paper and roped for shipment. Job was completed in eight days, half the time allotted. The American Red Cross sees to it that every serviceman overseas receives a package on Christmas day.



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IDEA!

Bags of Alcoa Aluminum Foil will be made, after the war, in this and other styles to suit your needs.

....for bag users

There's new reason for interest in bags of Alcoa Aluminum Foil

First, let's be realistic. Aluminum foil bags can never be as cheap as paper bags. No, not even *nearly* as cheap.

However, the war-born abundance of aluminum can't help but have an effect on the price of foil bags, postwar. That price should be more interesting than any you've ever had in the past.

There's another reason for re-examining foil bags for packing your product . . . new construction and sealing techniques. Plastic coatings and membranes teamed up with aluminum foil will make bags stronger. Thermoplastic sealing agents will make all seams tighter.

These new reasons plus the old ones . . . aluminum foil's inherently superior protective properties . . . challenge the thinking of bag users. They demand a look-see by even those who use cartons, cans and glass containers. These metal bags may well be the answer to lower packaging costs with complete protection for your product.

The actual answer must wait till the war's end. Meanwhile some study of the idea is indicated, for the reasons mentioned. Shall we make it a co-operative study? ALUMINUM COMPANY OF AMERICA, 2129 Gulf Building, Pittsburgh, Pennsylvania.

Aluminum IS A NATURAL PROTECTOR

Alone, or in combination with other materials, it excels in preserving freshness, flavor, volume, aroma and color of products that are sensitive to air, light, radiant heat and gain or loss of moisture. Its sparkling beauty makes a handsome package, too.



Think of **ALCOA ALUMINUM**

when you think of tomorrow's packages



WORRYING

★ ★

**do a Master Job
TO-DAY!**

*Another good thought
passed on by*



MAKERS OF

**FOOD PROTECTION
PAPERS**

KALAMAZOO VEGETABLE PARCHMENT COMPANY
PARCHMENT KALAMAZOO 99 MICHIGAN
BRANCH PLANTS IN PHILADELPHIA, PA., AND HOUSTON, TEXAS



YOUR POSTWAR PACKAGE

The Time to Start Planning it is NOW!



If the war should end tomorrow what you will have to offer the postwar world will be precisely what you have ready today.

Recognizing this . . . many forward-thinking concerns are already planning their postwar packages . . . working out now, details for which there may well not be time later. Why not consult a Milprint representative today? There is no obligation.



Printed Cellophane, Pliofilm, Glassine, Aluminum Foil, Coated and Laminated Papers in all forms including Sheet Wraps, Rolls, Pouches or Specialty Bags.

Revelation Bread Wraps, Specialty Folding and Window Cartons, Counter Displays, Simplex Pie and Cake Units.

Lithographed Advertising Displays, Specialized Letterpress and Rotogravure Printing of All Kinds.

MILPRINT Inc.

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PAPERBOARD FOR POST-WAR PACKAGES



ONE THING YOU CAN PLAN ON!

IN A WORLD of uncertainties, there is one sure fact you can include in your postwar planning! Paperboard will play a major role in future packaging,

Based on its performance since Pearl Harbor, this versatile packaging material opens up whole new vistas of beauty, economy, and utility in the packaging field.

Here at Sutherland you will find the right combination for your postwar packages—men with a lifetime background of packaging

design and technique plus men with production know-how, backed by huge modern plants for paperboard manufacture, printing, and fabrication into all shapes, sizes, and types of packages.

Let us start work now on your future packaging program. We can have your post-war packages designed, approved by you, and ready for production the minute the green light flashes.

Write us about your problem!

SUTHERLAND PAPER COMPANY

KALAMAZOO 13D, MICHIGAN

"CEL-O-SEAL" BANDS

*protect the purity
of Lilly pharmaceutical
products*

The makers of quality drugs and pharmaceuticals fully recognize the necessity of protecting their products. Today many leading manufacturers are using CEL-O-SEAL cellulose bands for added protection of package closures.

The application of a CEL-O-SEAL band is the modern method of sealing closures securely in place. These bands keep closures on. They forestall tampering with the contents of bottles, jars and other containers. They help prevent evaporation and leakage and assure that health-guarding products retain maximum possible strength.

Whatever your package closure problem . . . consider CEL-O-SEAL. There are many types and styles, colors and sizes. Write for complete information. E. I. du Pont de Nemours & Co. (Inc.), "Cel-O-Seal" Section, Empire State Bldg., New York 1, New York.

Also sold by: Armstrong Cork Company, Glass & Closure Division, Lancaster, Pa.—I. F. Schnier Co., 683 Bryant St., San Francisco, Calif.



DU PONT CEL-O-SEAL BANDS

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

all of 'em

Old liquid adhesives animal glues...

● Yes, there are cold vegetable adhesives or hot animal glues made by Swift & Company for *all* uses, including the following:

Bookbinding
Bottle labeling
Carton sealing
Case sealing
Folding boxes
Laminating
Leather goods
Loose leaf binders
Magazine coverings
Mounting
Padding
Remoistening
Spreader sets
Tight wrapping
Tin labeling
Tube winding

Can we help you?

There are still a lot of noncritical adhesives available. There are still many ways to do a good gluing job, even under present conditions.

Our work today isn't "selling"; rather, it's "helping"... helping our customers meet the fast changing conditions due to new materials, new container problems, new demands, and new restrictions.

Today our 50 years of glue and adhesive experience is proving most helpful to many customers. It's yours for the asking.

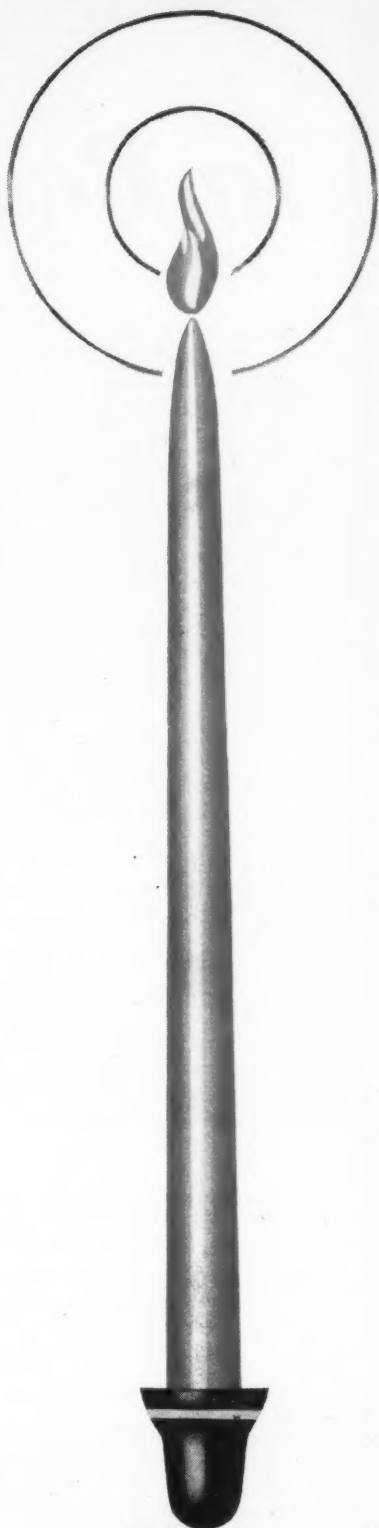
Can we help you?

SWIFT & COMPANY

Glue Division • Chicago 9

Factories at: Chicago, Ill., Harrison, N. J.,
South San Francisco, Calif., St. Joseph, Mo., Omaha, Neb.

Stocks carried at many of our branches and plants throughout the U. S. A.



It won't be the
same as former holidays but,
for "their" sakes, let's keep
our vision clear, our chins up,
and our faith steadfast. And
in that spirit we send you

CHRISTMAS GREETINGS



FRANK D. PALMER, INC.

528-34 North Western Ave. • Chicago (12) Illinois • CNEscape 3344

PACKAGE DEVELOPMENT LABORATORY ★ SPECIAL MACHINERY MANUFACTURER

DECEMBER • 1943

11

MORALE... *in Bags*



Among the bags produced for war service by Bemis are Multiwall Paper Bags slipped over cloth bags for foods to be shipped overseas. These packages are especially designed so they can be tossed into the water and carried ashore without damage to contents.

Morale among fighting men depends upon full mess kits, and Uncle Sam spares no effort to see that his warriors on land and sea are the best fed in the world.

Getting this all important food to the men on our far-flung fronts in a sound, wholesome condition is just as important as "keeping their powder dry." It's a task that calls for wide experience and know-how...a task the bag industry has taken in its stride.

In the 22 Bemis mills and factories more than 8,000 employees have made millions of bags to protect and transport food over land and sea, from farm and factory to fighting men. We like to think this our contribution to morale for Victory. In addition to this important work, we still find time to supply industry and agriculture with bags for other war materials and essential civilian goods.

Costs Cut and Losses Reduced With Bemis Multiwall Paper Bags

Bemis Multiwall Paper Bags are economical, one-trip containers that guard against moisture and thus reduce caking and loss of quality. Their extra strength maintains output by minimizing breakage on production lines. Bemis self-forming gussets speed filling and closing. Brilliant Bemis printing makes brands stand out.

Let us work with you in supplying bags for your war or civilian production. From the bags themselves to their filling, closing, shipping and storing, our staff of experts can help you. If you have a packaging problem... present or future... let's talk it over.

BEMIS BAGS



BEMIS BRO. BAG CO.

Peoria, Ill. • East Pepperell, Mass. • Mobile, Ala.
San Francisco, Calif. • Wilmington, Calif. • St. Helens, Ore.
Baltimore • Boston • Brooklyn • Buffalo • Charlotte • Chicago • Denver
Detroit • Houston • Indianapolis • Kansas City • Los Angeles • Louisville
Memphis • Minneapolis • New Orleans • New York City • Norfolk • Okla-
homa City • Omaha • St. Louis • Salina • Salt Lake City • Seattle • Wichita

BETTER BAGS FOR 85 YEARS

ISN'T ONE
SOURCE OF SUPPLY
JUST ABOUT AS
GOOD AS ANOTHER,
MR. COOK?

THAT DEPENDS ON
WHAT YOU EXPECT
FROM THE SUPPLIER

All of us in the glass container and closure industry do our best to make lighter, stronger, less expensive containers, and dependable, more efficient lower cost closures. Each company, to promote these improvements, spends in research and development as much as it can afford. And the efforts of all are, of course, commendable. But some companies succeed beyond others in improving products, lowering prices or bettering service. This may be because of extensive experience, large facilities, exceptional financial ability, or a strong insistence upon a higher manufacturing standard. When, as with Anchor Hocking, all these attributes are combined, that company is, obviously, better qualified as a highly desirable source of supply.

M. L. COOK, one of Anchor Hocking's ablest and most popular men, has been a member of the Anchor Hocking family for 17 years.

**ANCHOR
HOCKING**



GLASS & CAPS

ANCHOR HOCKING GLASS CORPORATION - LANCASTER, OHIO



Their Supplies Are Packed Right



... in Apaco **CORRUGATED CONTAINERS**

The Armed Services are as exacting about the container as they are about its contents . . . that's why they ask every shipper to "Pack It Right to Reach the Fight."

Never has Apaco taken greater pride in its products. Apaco corrugated shipping cases, Belsinger textile cases, and Apaco folding cartons—all are proving themselves invulnerable convoys for precious supplies—getting them to every front dry . . . intact . . . and ready for action!

Branches

AUGUSTA PAPER COMPANY
Augusta, Ga.

GEORGIA-ALABAMA PAPER CO.
Columbus, Ga.

BISS PAPER COMPANY
Macon, Ga.

**VOLUNTEER STATE PAPER AND
BOX COMPANY**
Knoxville, Tenn.



Associates

MEMPHIS PAPER COMPANY
Memphis, Tenn.

LITTLE ROCK PAPER COMPANY
Little Rock, Ark.



**ATLANTA
PAPER CO.
ATLANTA, GA.**

Manufacturers of CORRUGATED CONTAINERS · FOLDING CARTONS · PAPER BAGS · PAPER PRODUCTS

Pliofilm

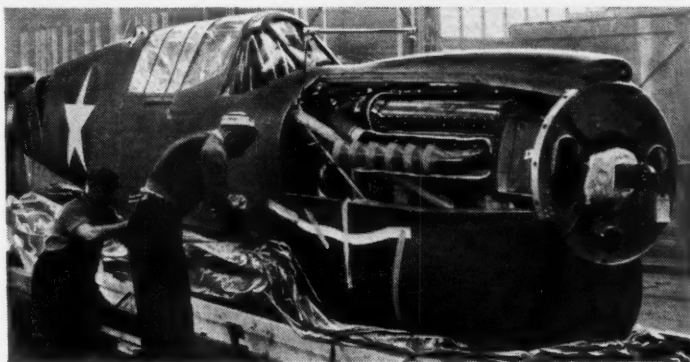
PROVEN IN WAR... SUPERIOR FOR POSTWAR PACKAGING

AIRCRAFT engines and fuselages now go to war wrapped and hermetically sealed in Pliofilm. Wherever they go, they emerge ready for action — as bright and spotless as the day they left the factory.

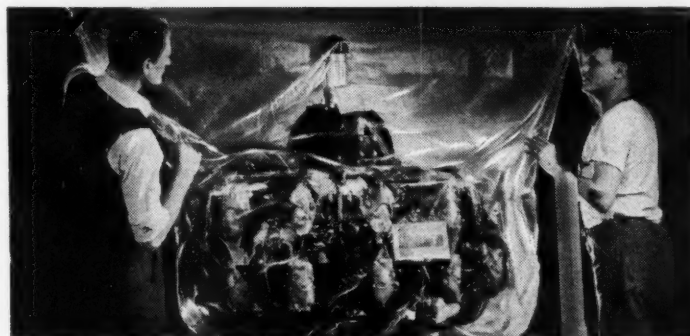
In the case of an aircraft engine, this use of Pliofilm saves 75 man-hours, once required for the coating and removal of heavy grease protection against moisture. No other pliable, transparent packaging material has saved so much precious time in war — or withstood such severe moisture tests.

With peace there will be more Pliofilm than ever before available to the packaging industry. Remember then what Pliofilm does now.

Pliofilm is the packaging material that keeps moisture where you want it. Whether your product requires preservation of moisture content — like garden-fresh vegetables, or must be kept moisture-free — like sulpha drugs, Pliofilm will answer your postwar packaging problem. And gleaming, transparent Pliofilm is an attractive merchandising feature.



P-40 Warhawk "canoes," in Pliofilm, ready for immediate fighting.



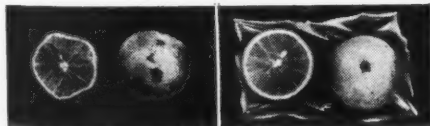
Jewel-like precision of aircraft engines retained by Pliofilm.

WHAT PLIOFILM CAN DO FOR YOU

Actual experiments conducted by the Agricultural Experiment Station of the University of Florida.



EIGHTEEN MONTHS IN PLIOFILM! Remember what happens to ordinary unwrapped carrots after a week in the icebox? These Pliofilm-protected carrots were stored at 37° — for a year and a half. Official report: "Loss of weight was negligible, and the carrots held their color perfectly — retained their firmness and vitamin content."



ALL FOUR MONTHS OLD! But the still-perfect oranges were "stretch-wrapped" in Pliofilm. Official report: "The oranges wrapped in Pliofilm lost less than 2% of their initial weight after four months' storage — the original taste and appearance of the fruit were unchanged — Vitamin C content very slightly diminished."

Pliofilm seals moisture in fruit, vegetables, cheese, frozen foods, tobacco, meats and other products with moisture content that should be preserved. And it seals moisture out of such moisture-sensitive products as dehydrated foods, peanuts,

potato chips, pharmaceuticals, precision instruments and cables. Two-way moisture control makes literally thousands of applications for Pliofilm. For information write: Pliofilm Sales Dept., Goodyear, Akron 16, Ohio.

THINGS ARE BETTER PACKAGED IN

Pliofilm

Pliofilm—T.M. The Goodyear Tire & Rubber Company



As white as



JUST LIKE PAINTING A HOUSE,
Coated Lithwite, with its surface
mineral coating, gives you just
the white you want.

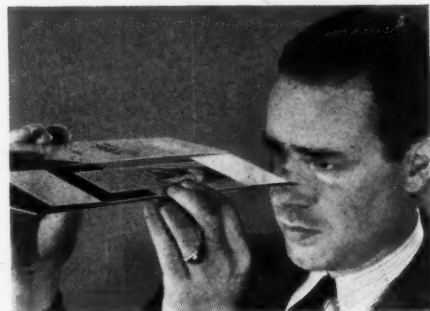
bright as ever!

Despite the shortage of critical wood pulps which necessitate the use of pulps of darker and poorer quality, you can still get folding cartons as white and bright as ever with Coated Lithwite

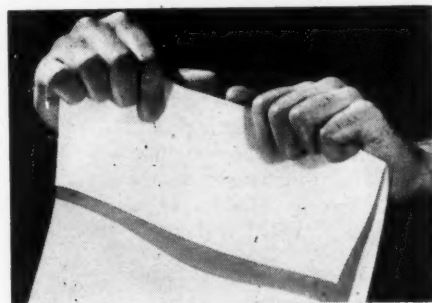
AS YOU KNOW, many high-grade paperboards *have* been affected by war conditions. But not *Coated Lithwite*. Its original whiteness and brightness, its brilliant printability, its unusual folding and sealing qualities have been maintained. And the reason: *the surface coating of this revolutionary paperboard is compounded of noncritical materials!*

All of this should be good news to carton buyers. For this genuine *mineral-coated* paperboard enables you to give your packages the advantage of better appearance and, fortunately for you — because there have been fewer problems in the production of *Coated Lithwite* than in some other high-grade paperboards — limited quantities of *Coated Lithwite* cartons are available from time to time.

Write. We will send you printed samples so you can compare the striking qualities of *Coated Lithwite* with your present cartons. Better still. Send along detailed specifications and a sample of your present carton and we will submit a quotation so you can also make a down-to-the-penny cost comparison with the cartons you are now using.



FINER PRINTING. Coated Lithwite's surface is so uniform and hard, so free from "chalkiness," that inks stand up brilliantly, halftones and type print crisply—without fill-up or smudge.



BETTER PERFORMANCE. Coated Lithwite bends, scores and folds without shattering. Takes a tight seal—and is not temperamental about the type of glue used.

The GARDNER-RICHARDSON Co.

Manufacturers of Folding Cartons and Boxboard

MIDDLETOWN, OHIO



Sales Representatives in Principal Cities: PHILADELPHIA • CLEVELAND • CHICAGO • ST. LOUIS • NEW YORK • BOSTON • PITTSBURGH • DETROIT

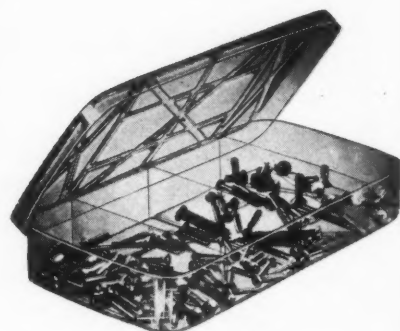
DECEMBER • 1943

17

STRONG LOW-PRICED TRANSPARENT UTILITY BOXES



STOCK MOLD
or
CUSTOM MADE



We also manufacture plastics in other forms: injection and compression molded boxes; extruded rods, tubes and special shapes including collapsible tube bodies; acetate and butyrate sheet cut to size in thicknesses from .003" and up.

● We manufacture a complete line of sturdy drawn transparent plastic boxes in all shapes and sizes. Typical models are shown in photo. Every size and shape can be manufactured to meet specifications. Rounds, squares and oblongs are all available, and inserts and partitions may be inserted to meet your requirements.

These boxes are presently being used by the Army, Navy and Marine Corps for a great many purposes. They are used in war plants for storing and routing sub-assemblies and for small parts in repair and service departments. They give protection and visibility at the same time.

Production facilities are ample to handle large orders. Prices and samples will be sent on request.

End use must be permissive under WPB rules and regulations for sample requests and orders to be filled.

THE GREAT AMERICAN PLASTICS CO.

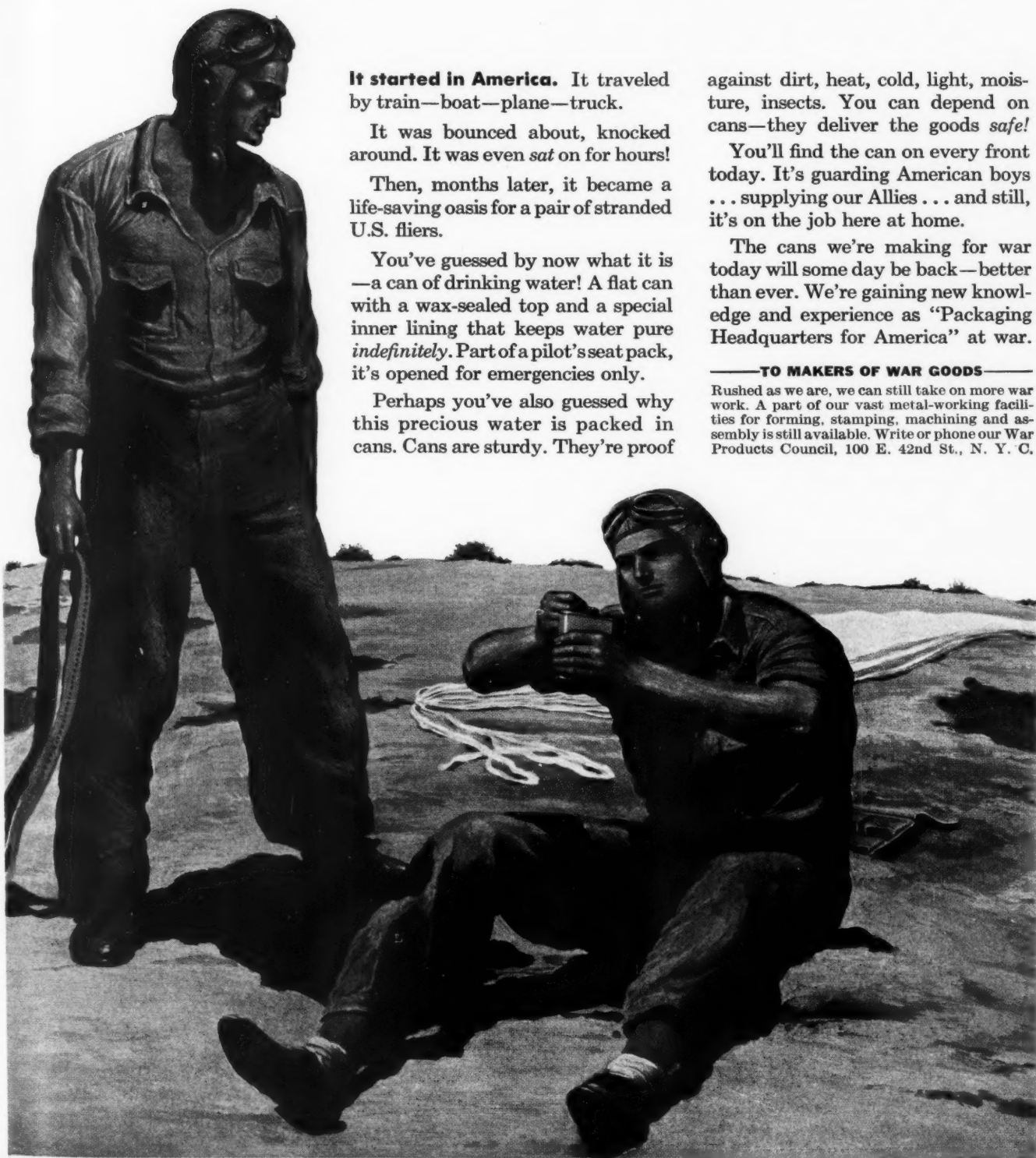
"Plastics Fabricated by Every Method Known to Industry"

INJECTION • EXTRUDING • COMPRESSION • TRANSFER MOLDING • HOLLOW MOLDING & FORMING • SHEETS • ROD-TUBES AND SPECIAL SHAPES

Telephone: Leominster 1650 • LEOMINSTER, MASSACHUSETTS • Teletype Leominster 295

New York City Sales Agency: 27 West 20th Street • Chelsea 3-0267-8

The story of the traveling oasis



It started in America. It traveled by train—boat—plane—truck.

It was bounced about, knocked around. It was even *sat* on for hours!

Then, months later, it became a life-saving oasis for a pair of stranded U.S. fliers.

You've guessed by now what it is—a can of drinking water! A flat can with a wax-sealed top and a special inner lining that keeps water pure *indefinitely*. Part of a pilot's seat pack, it's opened for emergencies only.

Perhaps you've also guessed why this precious water is packed in cans. Cans are sturdy. They're proof

against dirt, heat, cold, light, moisture, insects. You can depend on cans—they deliver the goods *safe*!

You'll find the can on every front today. It's guarding American boys . . . supplying our Allies . . . and still, it's on the job here at home.

The cans we're making for war today will some day be back—better than ever. We're gaining new knowledge and experience as "Packaging Headquarters for America" at war.

—TO MAKERS OF WAR GOODS—

Rushed as we are, we can still take on more war work. A part of our vast metal-working facilities for forming, stamping, machining and assembly is still available. Write or phone our War Products Council, 100 E. 42nd St., N. Y. C.

It gets there—safe—in cans

CONTINENTAL CAN COMPANY



HELP CAN THE AXIS
—BUY WAR BONDS

A MIRACLE THEN . . .



In 1839, Niepce and Daguerre of Paris discovered how to fix an image on a tin plate, and the art of photography was born... Tin-type methods were simple and crude beside the long-range, high-speed, full-color photography of today.

NEUTRAGLAS . . . offering the highest resistance to solvent action and chemical attack . . . was developed by Kimble because no glassware can be just "good enough" if better is obtainable.



Standardize NOW on Kimble Ampuls, Serum Vials, Serum Bottles and Clinical Glass containers of NEUTRAGLAS.



• • • The Visible Guarantee of Invisible Quality • • •

KIMBLE GLASS COMPANY • • • VINELAND, N. J.

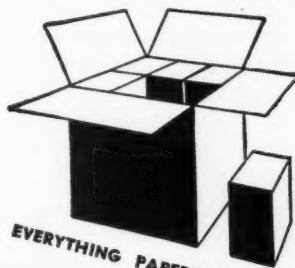
NEW YORK • CHICAGO • PHILADELPHIA • DETROIT • CINCINNATI • INDIANAPOLIS • SAN FRANCISCO

Here goes a case of tobacco!



DAD still gets his pipeful—even though its peacetime package has gone to war. For versatile paper-board cartons and shipping cases have successfully taken over hundreds of new packaging jobs—releasing metals, rubber, plastics and other critical materials for war use.

Because conversion to paper-board has always been a specialty at Container Corporation, we've had a large share of this work. Our staff are wizards at developing or adapting finishes, coating, linings, designs for particular types of products—and rich in that combination of experience and imagination that produces ideas.



EVERYTHING PAPERBOARD FOR EVERYTHING PACKED

CONTAINER CORPORATION OF AMERICA

General Offices: 111 W. Washington St., Chicago • New York • Rochester • Natick, Mass. • Philadelphia
Akron • Cincinnati • Cleveland • Circleville • Detroit • Indianapolis • Wabash • Carthage • Anderson, Ind.
Peoria • Rock Island • Minneapolis • Baltimore • St. Louis • Fernandina • Dallas • Ft. Worth



A WAR PRODUCTION RECORD

The divisions of General Printing Ink Corporation are contributing to the war effort in various ways. The list below represents sundry items which they have developed or manufactured for the government and the armed forces. Several technical assignments and experiments cannot be divulged.

- ★ ★ ★ ★ Cameras for the Engineer Corps.
- ★ ★ ★ ★ Oil coolers for the Navy.
- ★ ★ ★ ★ Shell trimmers (both for small arms and guns).
- ★ ★ ★ ★ Machining ship parts for the Navy and Maritime Commission.
- ★ ★ ★ ★ Parts of range finders for the Navy.
- ★ ★ ★ ★ Equipment for marking wire and cable used in air armament.
- ★ ★ ★ ★ Special printing machinery for product identification.
- ★ ★ ★ ★ Equipment for map reproduction for Engineer Corps.
- ★ ★ ★ ★ Printing and photographic equipment for reproduction of templates for airplane industry.
- ★ ★ ★ ★ Equipment for aircraft instrument dials.
- ★ ★ ★ ★ Photo-composing machines for Bureau of Engraving and Printing.
- ★ ★ ★ ★ Equipment for Signal Corps.
- ★ ★ ★ ★ Navy blue compound (for waterproofing and flameproofing duck for the Navy).
- ★ ★ ★ ★ Compound for shrimp net coating (fireproof, infra-red reflectance camouflage specifications).
- ★ ★ ★ ★ Nylon coatings and raincoat coatings for Quartermaster Corps.
- ★ ★ ★ ★ Development and manufacture of fluorescent inks used by the air forces of this country and some of the foreign powers.
- ★ ★ ★ ★ Inks for the Engineer Corps and Navy.
- ★ ★ ★ ★ Shell marking and identification inks.
- ★ ★ ★ ★ Fingerprint inks for Army, Navy and Medical Corps.
- ★ ★ ★ ★ Parachute marking inks.
- ★ ★ ★ ★ Inks for marking communication equipment for Signal Corps.
- ★ ★ ★ ★ Duplicating and printing inks for Office of Emergency Management.
- ★ ★ ★ ★ Special printing inks for Lend-Lease.
- ★ ★ ★ ★ Printing and lithographic inks for all branches of armed services.
- ★ ★ ★ ★ Navy fireproof non-skid deck paints.
- ★ ★ ★ ★ "Sea Slicks" for designation of submarines, lifeboats, rafts, targets, etc., for the Air Force and Navy.
- ★ ★ ★ ★ Tentage Compound (for waterproofing and flameproofing duck for the Army).
- ★ ★ ★ ★ Various camouflage compounds for both Army and Navy to be used on osnaburg cloth, jute, burlap and paper.
- ★ ★ ★ ★ Gas resistant and waterproof coatings for Army and O.C.D.
- ★ ★ ★ ★ Identification inks for synthetic rubber program.

GENERAL PRINTING INK CORPORATION
100 SIXTH AVENUE, NEW YORK 13, N. Y.

DIVISIONS

AMERICAN PRINTING INK COMPANY • CHEMICAL COLOR & SUPPLY COMPANY • EAGLE PRINTING INK COMPANY • RUTHERFORD MACHINERY COMPANY • THE FUCHS & LANG MANUFACTURING CO. • GENERAL INDUSTRIAL FINISHES • GEO. H. MORRILL COMPANY • ROTOGRAVURE • SUN CHEMICAL & COLOR COMPANY EXPORT • SIGMUND ULLMAN COMPANY • GENERAL PRINTING INK CORPORATION OF CANADA, LTD.

How to fix a good drink



COFFEE is a refresher. That's why every Army K-ration kit is supplied with the makings of a cup. And, to be certain the drink will be a good one, the coffee powder (enough for a cup) is packed in an envelope . . . air-tight, fume-proof, water-proof and vapor-moisture-proof. It is a teamwork job between metal foil and Lumarith* foil. To the favorable qualities of the metal, Lumarith adds the necessary toughness, waterproofness and protection of the printed instructions.

The same sort of packaging teamwork of Lumarith with other materials is responsible

for the safe delivery of a great part of the supplies and equipment shipped to our armed forces all over the globe . . . keeping food fresh and uncontaminated and equipment free of rust and ready for instant use.

The technical service department of Celanese Celluloid Corporation has information of value to manufacturers who are concerned with both short-range and long-range planning. You are invited to call or write. Celanese Celluloid Corporation, a division of the Celanese Corporation of America, 180 Madison Avenue, New York City 16.

LUMARITH PLASTICS IN FILM . . . FOIL . . . MOLDING MATERIALS AND OTHER FORMS

LUMARITH*

A CELANESE* PLASTIC

*Reg. U. S. Pat. Off.



The Best Wish is a Kind Thought

Throughout the coming holidays millions of family toasts will be raised to dear ones whose only home presence is of the mind and thoughts...

Appreciating that this year, one is inclined to more quiet, cherished reflections, it seems appropriate that we extend our thanks, with simple sincerity, as a greeting of kind thoughts in the hope that the family separations of this holiday season be firmly and permanently re-united long before the next to come... For such is the power of Peace!

Frank S. Kupfer

PRESIDENT, MANHATTAN PASTE AND GLUE COMPANY

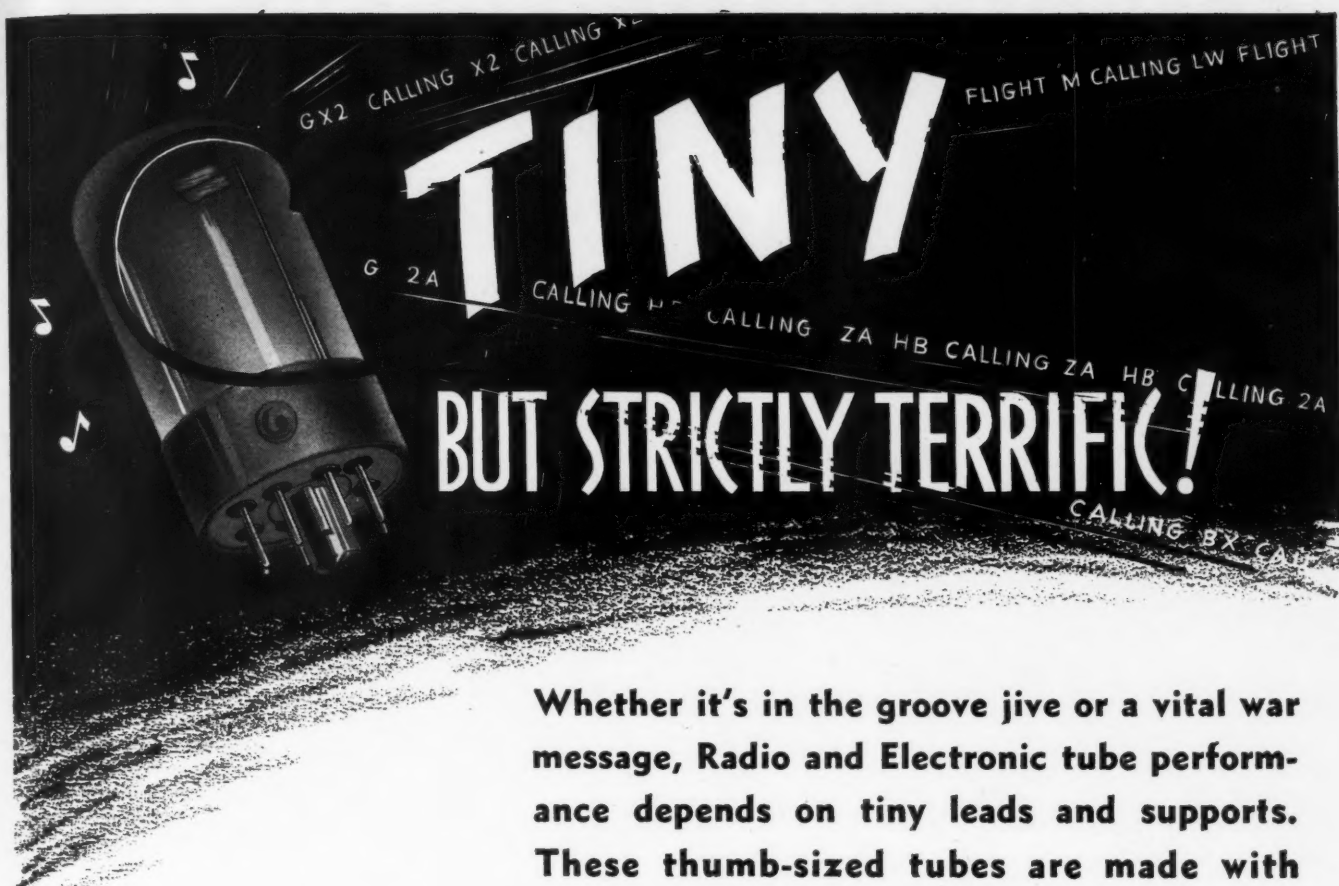


MANHATTAN PASTE & GLUE CO., INC.

Chicago
Philadelphia
Rochester
Boston
Columbus, O.

Lion Brand Adhesives

425 GREENPOINT AVENUE, BROOKLYN, N. Y.

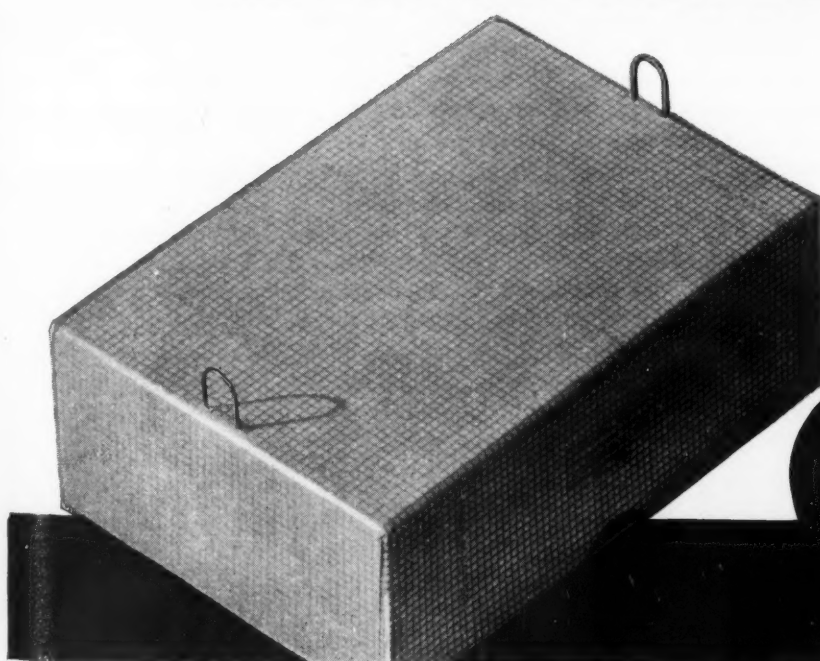


TINY

BUT STRICTLY TERRIFIC!

Whether it's in the groove jive or a vital war message, Radio and Electronic tube performance depends on tiny leads and supports. These thumb-sized tubes are made with Callite Tungsten elements.

components are extra sensitive—super durable. These delicate devices are shipped in **MASON MAILMASTERS** for extra safety—easy packing and sure delivery.



THE MASON BOX CO.
 ATTLEBORO FALLS, MASS.
 175 5TH AVE.
 NEW YORK

**"THIS YEAR, LET'S PAY THE BONUS
IN WAR BONDS**



... and drive even harder on the pay-roll savings plan!"

Make War Bonds the Christmas Order of the Day. Urge your workers to make their personal Christmas gifts in the form of War Bonds—and practice what you preach! Make this a 100% War Bond Christmas—to insure future Yuletides of peace and prosperity.

Make up your own posters to spread the "War Bonds for Christmas" story across your plant. Tell the story again and again on bulletin boards, in your plant magazine, and on pay envelope stuffers.

But don't forget your basic, all-important Pay-Roll Savings Plan. How's it going, these days? Perhaps it needs a bit of stoking-up right this very minute, to hold its full head of steam against the competitive demands of the holiday season.

Well, you're the man to stoke it! You can't expect it to keep running indefinitely on last summer's enthusiasm. See to it that your participation percentages, and your deduction percentages, *both* end up the year at new levels.

Every month, now your Pay-Roll Savings ought to run well ahead of the preceding month. *For so many families that formerly depended on the earnings of a single worker, now enjoy the combined earnings of several.* Such family incomes are doubled, trebled, even multiplied many times.

Now's the time to turn as much as possible of these increased earnings into War Bonds—War Bonds for Christmas . . . and War Bonds the whole year 'round!

GIVE THE PRESENT WITH A FUTURE—WAR BONDS!

This space contributed to Victory by **BRESKIN PUBLISHING CORP.**

This advertisement prepared under the auspices of the United States Treasury Department and the War Advertising Council

1 PART IN 2000 MAKES IT CLEAR



Yes
**THERE'S A
DIFFERENCE
IN GLASS**

YOU may find it hard to believe that any ingredient of fine glassware must be measured in a quantity as small as *five one-hundredths of one per cent* of the entire batch. But it's true. For instance, as little as one pound of one material in a ton of glass can make that glass decidedly clearer, brighter, more brilliant.

Such careful measurement means that the production of fine glass

depends, among other things, on fine, accurate control over the ingredients. As a rule, any of today's commercial glassware will have the clarity and brilliance you expect. You can take for granted that its ingredients have been weighed and mixed with care.

But the fact that only one pound of one ingredient in 2000 pounds of glass means better ware is important to you because it proves a point—the point that there can be, and often is, a *difference in glass*.

The difference is made up of things that are little in themselves

—such things as composition, thermal shock resistance, brilliance, clarity, toughness. When added together, they can make the big difference in the containers you buy, the difference between ordinary glass and top-quality glass.

That difference is important.

The skill and care that go into the making of Armstrong's Glass are pictorially described in our new booklet, "Men and Glass." For your free copy, drop a postcard to Armstrong Cork Co., Glass and Closure Division, 5912 Prince St., Lancaster, Pa.



ARMSTRONG'S GLASS



and **ARMSTRONG'S
CLOSURES**



Safer "Convoy" for precious supplies



Official U. S. Navy Photograph

Submarines and bombers are not the only menace along America's far-stretched supply lines. Sub-zero cold, scorching heat, extreme humidity, frequent hasty handling — all these can exact a costly spoilage toll, if perishable products are improperly packaged.

Warnercraft is helping "plug" such leaks. New and better paperboard containers have

been evolved — tough boxes and cartons that are moisture-proof, grease-proof, sift-proof.

A group of long-experienced Warner experts stands ready to assist you in securing safer transit for your product. They will help you help the war effort by packaging goods that reach the embattled users just as they left your plant.



YOUR PHONE IS ALWAYS HANDY

- ... For WARNERCRAFT SERVICE
- ... For WARNERCRAFT QUALITY
- ... For WARNERCRAFT PRODUCTS

Call Bridgeport 4-0101

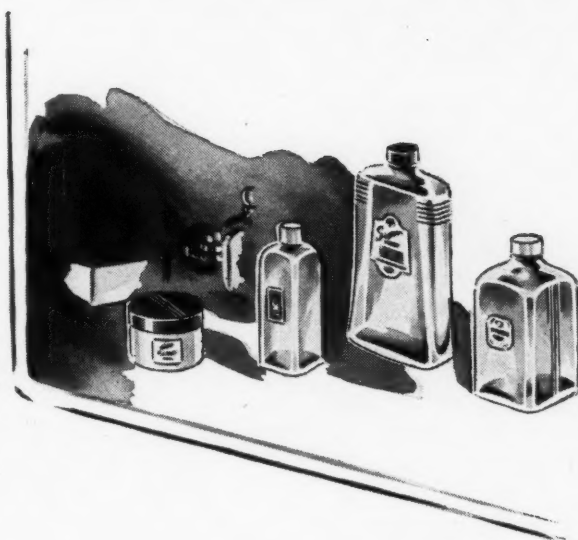
New York Ashland 4-1195

WARNERCRAFT

Makers of set-up and folding boxes of all types, transparent acetate containers, hand made specialties, counter displays and dispensers.

THE WARNER BROTHERS COMPANY

Main Office and Factory: 325 Lafayette Street, Bridgeport, Conn.
New York Sales Office: 200 Madison Avenue, New York, N. Y.



WHOA, ROVER!

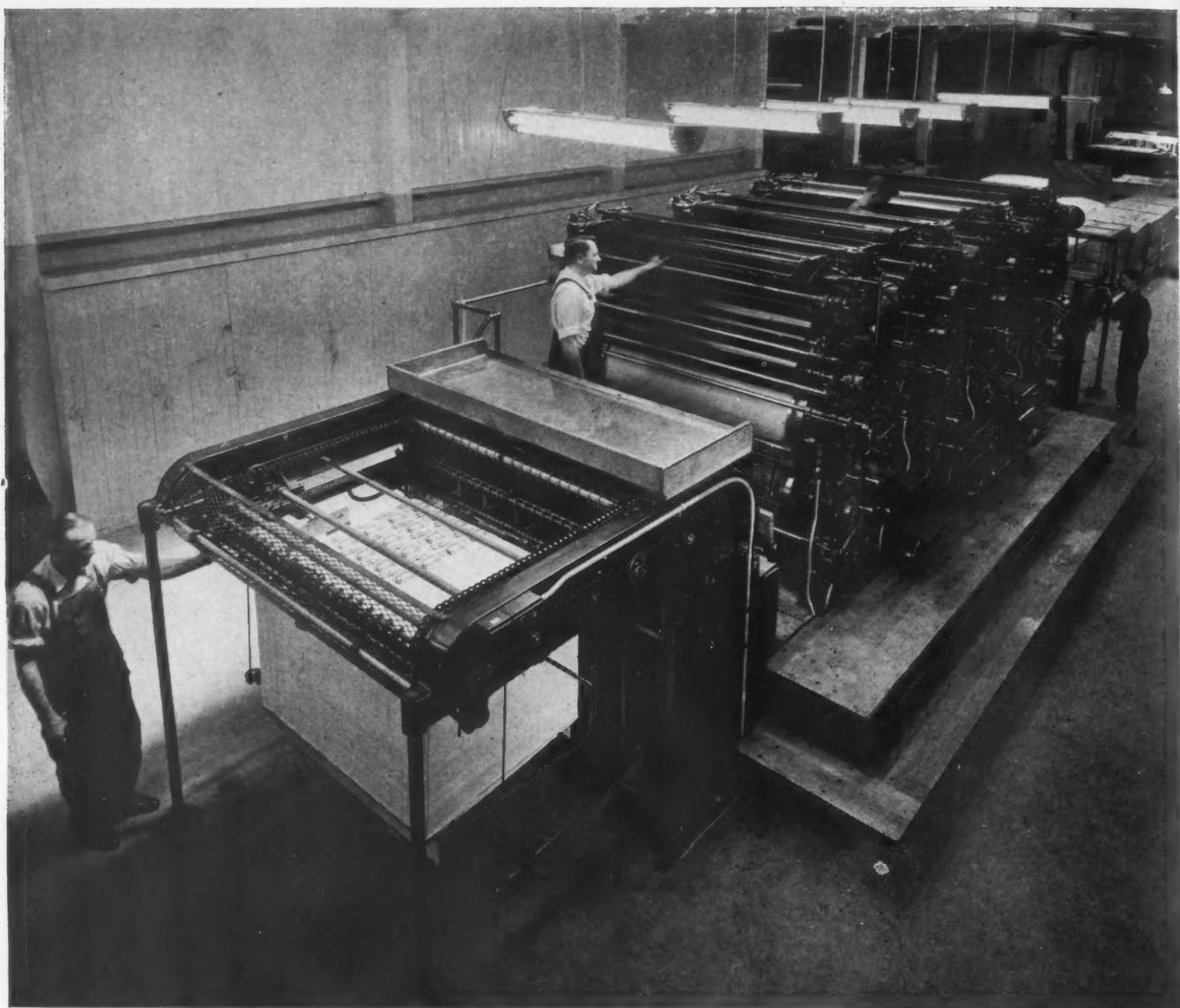
Naturally, Rover, you wouldn't understand—but your mistress' eye was caught by those gleaming, graceful Maryland Glass Bottles in the store window Yet, smart as are the Maryland Glass designs of pre-war origin, they will be supplanted by even more alluring styles after Victory In your post-war planning, keep posted on Maryland Glass bottles and jars.

MARYLAND GLASS CORPORATION, BALTIMORE, MD. New York: 270 Broadway Chicago: Berman Bros., 1501 S. Laflin St. St. Louis: H. A. Baumstark, 4030 Chouteau Ave. Memphis: S. Walter Scott, 435 S. Front St. Kansas City, Mo.: Aller Todd, 1224 Union Ave. Cincinnati: J. E. McLaughlin, 401 Lock St. San Francisco: Owens-Illinois Pacific Coast Co.

MARYLAND

Bottles & Jars





MODERN HIGH-SPEED FOUR-COLOR LITHOGRAPHY

The Harris Four-Color Offset Press illustrated above was recently installed in our San Francisco plant as part of an expansion program initiated more than two years ago. This modern press is the newest addition to the West's lithographing facilities. Purchased and built just prior to Pearl Harbor, it typifies the attention that we, as pioneers in Western lithography, continue to give to the installation and use of the most modern lithographic equipment, and our desire to maintain our customary speed in delivering top quality work.

The Harris Four-Color Offset Press represents the last word in four-color process reproduction equipment. It prints 5,000 sheets, 42" x 58" (or smaller), per hour in one operation. With its Harris Stream Feeder, it assures

top production—bettered by few other presses installed anywhere in the country.

This Company has added the names of some of the West's largest label users and advertisers to its list of customers since the new Harris press was installed. Lithographic reproduction for these many concerns has been handled expeditiously, and always in a highly satisfactory manner. The quality of such work has, without exception, been of the very highest order.

We invite our old customers as well as others to take advantage of our new facilities. Call for a salesman. Let us place that new lithograph job of yours on our production schedule for early delivery.

THE LOUIS ROESCH CO.

Lithographers and Printers Since 1879

1886 MISSION STREET • SAN FRANCISCO, CALIF.



AN AVERAGE of five more tons per car . . . that's the war-load being shouldered by the railroads.

And that's why "floored" shipping boxes must support many more pounds per package.

One case for better packaging rests on that fact. Crushed shipping boxes mean damaged merchandise. That means waste of materials, manpower, time and shipping space . . . waste that can be greatly curtailed by use of sturdy corrugated boxes engineered to meet the new conditions.

Ask an H & D Package Laboratory to check your shipping boxes. A few pennies more in the right place may enable you to cut losses enormously.

Protect the Product

BETTER SEE H&D AUTHORITY ON PACKAGING

PACKAGING "TEXT-BOOKLETS" FREE



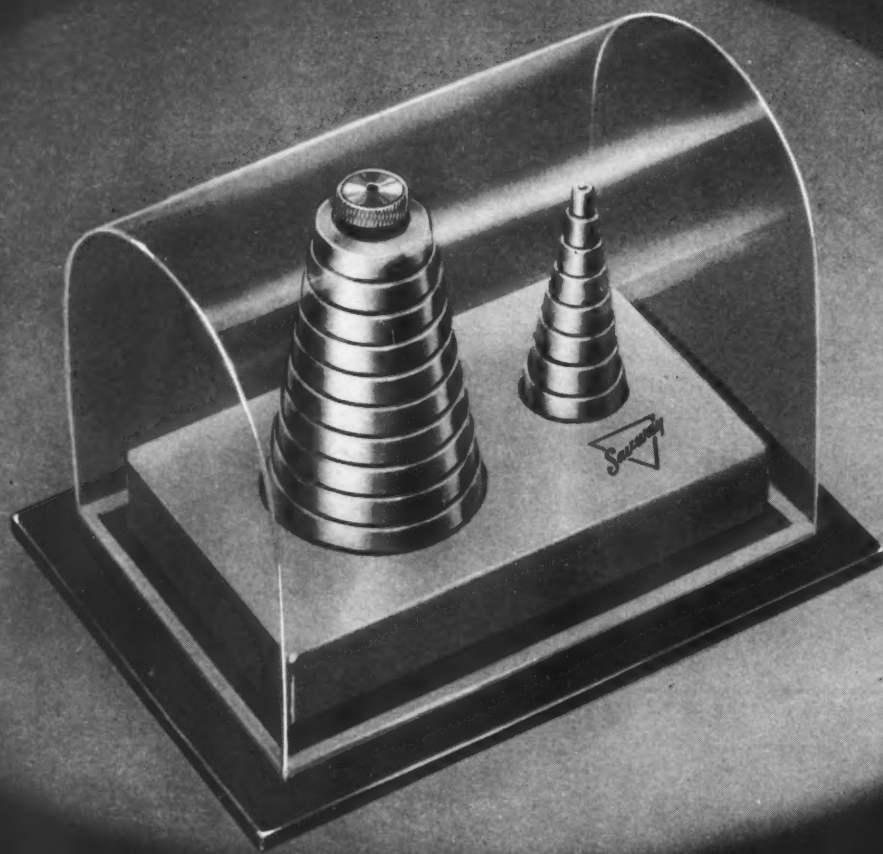
Here's a handy source of practical shipping information to help you solve day-to-day shipping problems. It will pay you to take this "refresher-course" in packaging. The cost? A penny post card. Mail your requests to . . .

HINDE & DAUCH, Executive Offices:
4314 Decatur Street, Sandusky, Ohio

FACTORIES in Baltimore • Boston • Buffalo • Chicago • Cleveland • Detroit • Gloucester, N. J.
Hoboken • Kansas City • Lenoir, N. C. • Montreal • Richmond • St. Louis • Sandusky, Ohio • Toronto

MODERN PACKAGING

for a Precision Tool . . .



... that Provides a MODERN Method of Checking Micrometers and Other Precision Inspection Devices

Sav-Way's new set of Master Setting and Checking Rolls is housed as befits a precision tool of this calibre, in a modern transparent plastic case.

Precision tools and inspection devices are only as accurate as the methods and gages by which they are set and checked. When

anvils are worn unevenly, flat gage blocks cannot give accurate readings. Sav-Way Master Setting and Checking Rolls provide for the first time a really accurate means of checking micrometers, snap-gages, amplifiers, dial indicators, and other inspection devices, under all conditions of wear.

SAV-WAY MASTER SETTING AND CHECKING ROLLS



The set consists of 20 rolls ranging from .100" to 2.000" in diameter. Rolls are hardened, ground, and lapped to X gage tolerance. They are deep frozen before finish grinding to eliminate internal strains and provide accelerated ageing.

Send for Illustrated Literature

Sav-Way INDUSTRIES

★ Products Division ★

4875 EAST 8-MILE ROAD • BOX 117, HARPER STATION
DETROIT 13 • MICHIGAN

PRODUCERS OF SAV-WAY HAND AND HYDRAULIC GRINDERS • SAV-WAY GOLD SEAL SPINDLES
PLUG GAGES • PRECISION AIRCRAFT AND AUTOMOTIVE PARTS



A Stroke of the Pen

in London or Berlin may change the entire course of your business.

It takes far less time to unconditionally surrender a shattered army than it does to change a business from a war to a peacetime basis.

Today, Old Dominion's creative and engineering staffs are studying the possibilities of the new materials and new methods which have been produced by this war. They are ready, now, to apply their knowledge to your peacetime packaging.

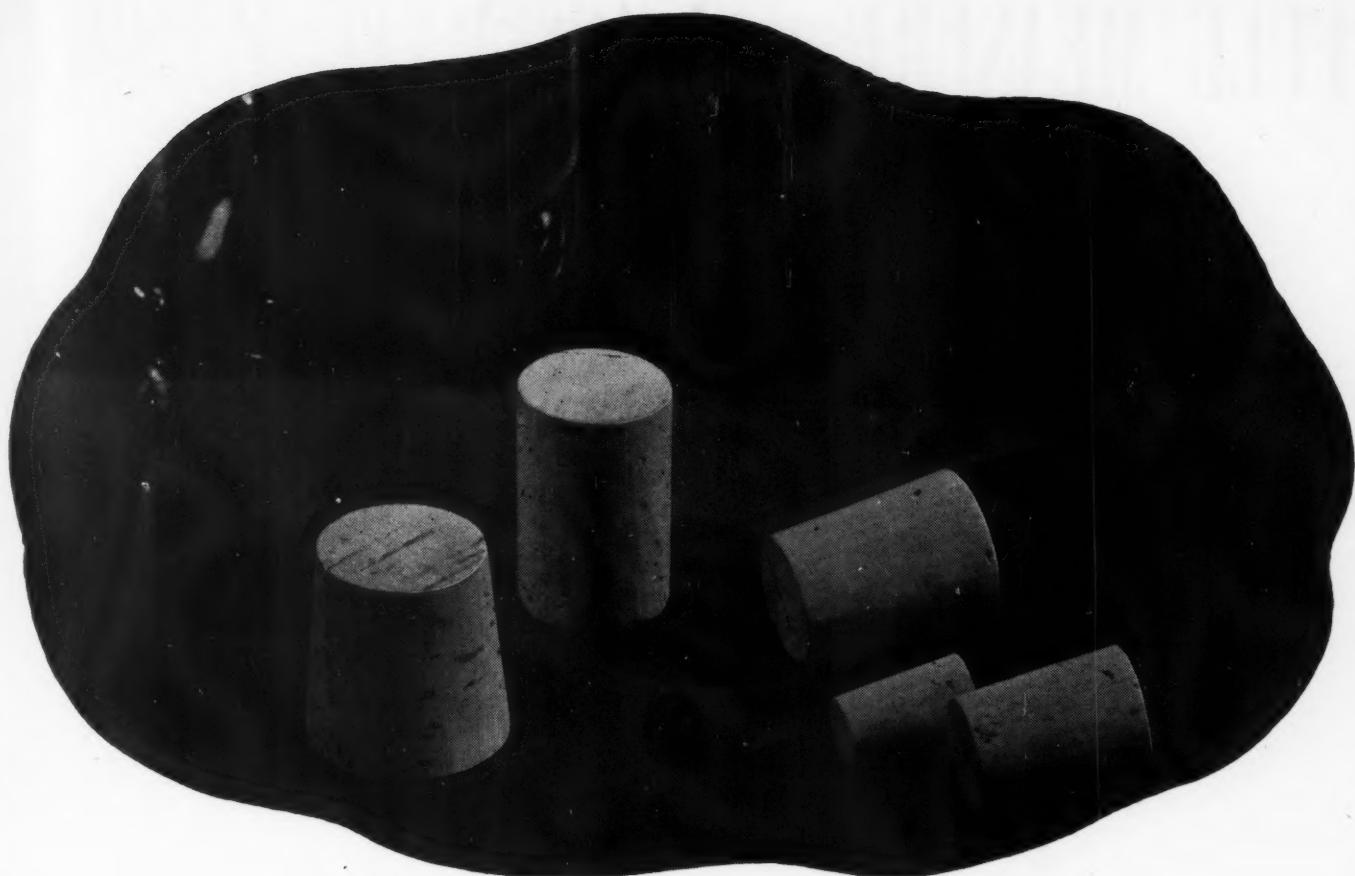


OLD DOMINION BOX COMPANY

CHARLOTTE NORTH CAROLINA
PLANTS IN NINE SOUTHERN CITIES

Folding Cartons • Set-Up Boxes • Convolute • Spiral Wound and Corrugated Containers

"THE SOUTHERN BOXMAKER WITH A NATIONAL REPUTATION"



IF YOU PLAN TO USE CORKS IN '44

**. . . you can't afford to use
anything but top quality**


AT the present moment, it appears fairly certain that there will be an adequate supply of top-quality corks of all types to meet packers' closure needs in '44. There are no restrictions on the use of cork and a plentiful stock of corks is available.

Restrictions on containers, and on the manufacture of many products themselves, however, are still in force. Because of these, and other wartime limitations, many

packers face the possibility of not being able to produce enough packages to take care of all their customers. This makes it more important than ever before that you use top-quality corks in '44.

For top-quality corks help you make sure that every package you can produce reaches your distributors in saleable condition. They reduce losses in production and distribution due to faulty sealing. They keep the contents of your

packages safely, surely sealed, ready for use in the best possible condition.

So, if you're using corks in '44, get them from the company whose name for 83 years has stood for quality in the cork field. You can get types, sizes, and quantities to suit your needs, deliveries to meet your production schedules. For further information, get in touch with your Armstrong representative, or write direct to the Armstrong Cork Company, Glass and Closure Division, 5912 Prince Street, Lancaster, Pennsylvania. 

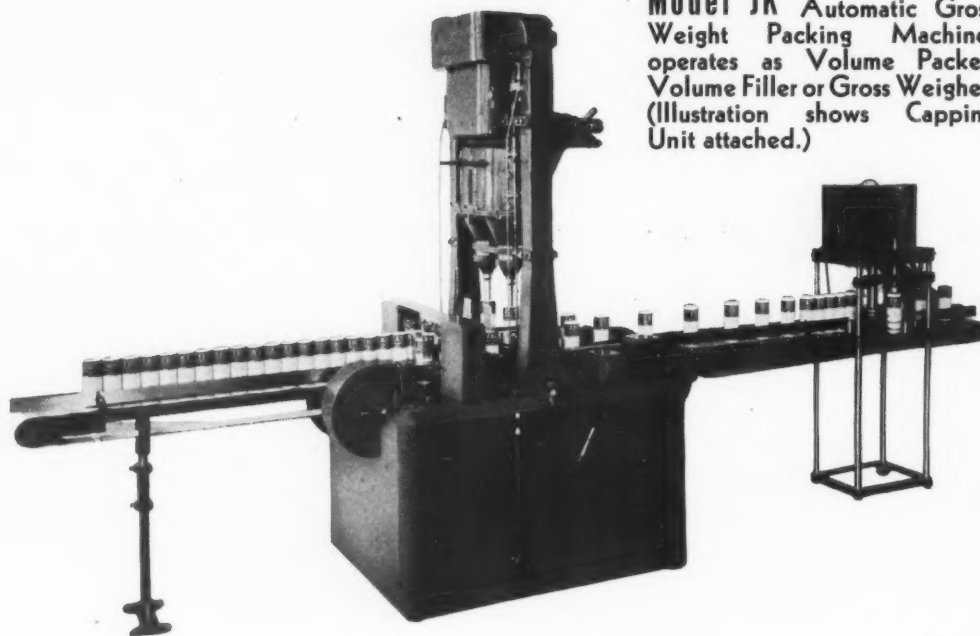


**ARMSTRONG'S
CORKS and CAPS**

FULL MEASURE and ACCURATE WEIGHT

by automatic packing

Model JK Automatic Gross Weight Packing Machine, operates as Volume Packer, Volume Filler or Gross Weigher. (Illustration shows Capping Unit attached.)



THIS completely automatic machine has two filling stations which pack by volume, fill by volume or weigh, according to the consistency of the product and the size of container. The machine also has provision for a vibrating device for settling the product when this is required.

Model JK is a late model machine and incorporates many improvements and refinements. One time-saving feature of value to the user is the hand control for quick adjusting of weight variation resulting from a change

in the density of the product. By the simple turn of a knob this variation can be corrected while the machine is running.

This machine handles powdered and granular materials of all descriptions. The fact that it will automatically pack the material, so as to get the exact quantity into the required size of container, makes it particularly desirable for the automatic filling of many difficult powdered products which require packing.

SPECIFICATIONS

Running Speed:	60 per minute (2 H.P.)		
Length:	12' including standard conveyor (longer conveyor optional)		
Width:	3' 4 $\frac{1}{2}$ "	Weight:	3400 lbs.
Height:	7' 4"	Operators:	None
Package Limits:	Base 5" x 4"		
	Height $\frac{1}{4}$ " to 12"		

UNITED STATES AUTOMATIC BOX MACHINERY CO., INC.

Makers of complete line of packaging equipment for weighing, filling, cartoning, closing, box-making and wrapping

Also owning and operating

NATIONAL PACKAGING MACHINERY CO. AND CARTON MACHINERY CORPORATION
18 Arboretum Road, Roslindale, Boston, Mass.

Branch Offices: NEW YORK • CLEVELAND, OHIO • CHICAGO, ILLINOIS



He's Got Both Feet on the Ground!

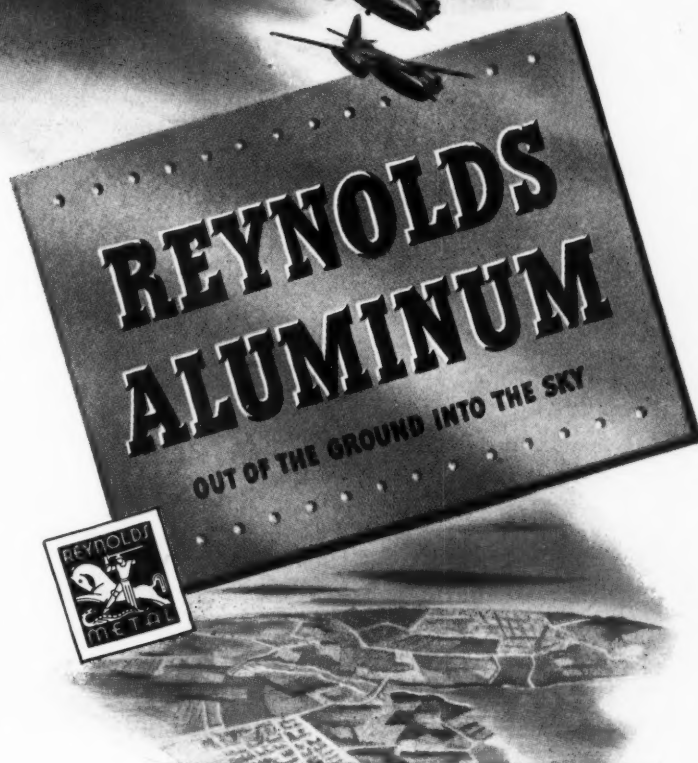
High above Munich or Munda, this boy has both feet on the ground. His heavy shoes are planted squarely on Reynolds Aluminum, made from Bauxite ore mined in America.

Long before Pearl Harbor, Reynolds anticipated coming events—the need for a great new source of aluminum. So, Reynolds staked all its resources to fill this need—to mine its own Bauxite—to build mammoth new plants.

Mounting U. S. plane production is proof of our success. Today, Reynolds is turning out hundreds of millions of pounds of finished metal. And some of it is going into every American plane now clearing the skies of Nazis and Japs.

Yes now our fliers have both feet on the ground because years ago we had our heads in the clouds, saw what was coming and did something about it.

REYNOLDS METALS COMPANY
General Offices, Richmond, Va. • Parts Division, Louisville, Ky.
37 PLANTS IN 13 STATES





STANDARDS IN WAR TIME

We are maintaining high standards of production on designed, printed and embossed wraps, labels and seals although sixty percent of our men are in the armed forces. No effort is too great to give our customers complete satisfaction in spite of difficult conditions.

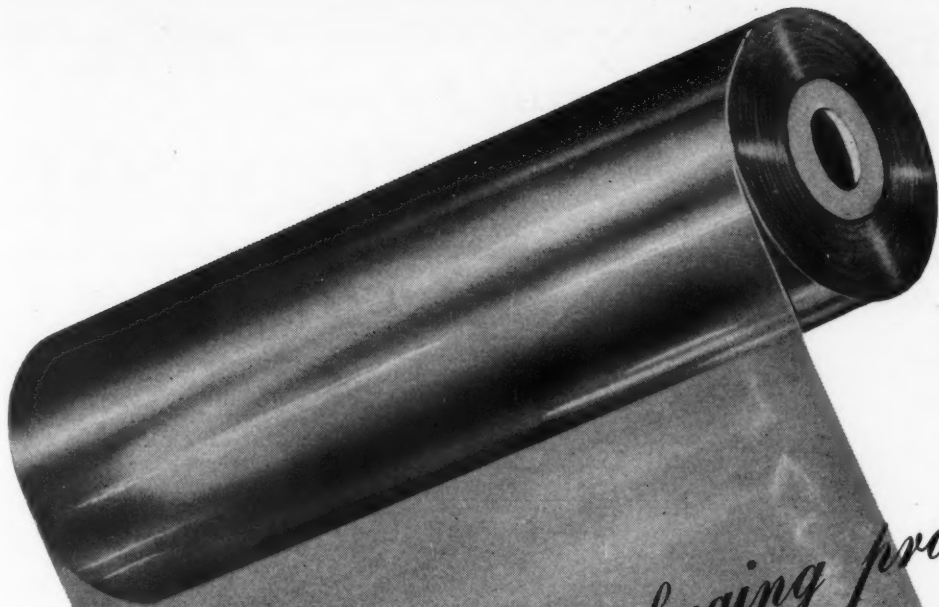
Working with substitute materials is not simple, and jobs take longer to produce, but they are still done well.

We are giving our best as we have done since 1905

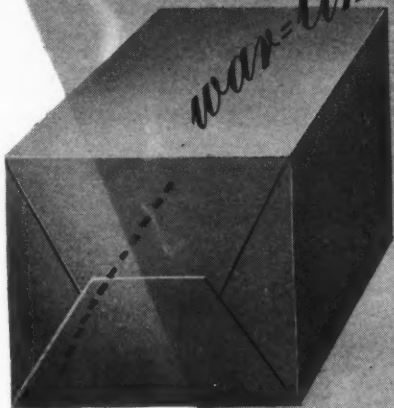
Richard M. Krause
INCORPORATED

52 E. 19TH ST., NEW YORK, 3 N.Y.





war-time packaging problems?



Sylvania Cellophane*

offers you technical service and cooperative assistance in:

selection of proper materials

package designing

fabricating

converting

sealing

testing

methods and machinery

for military and civilian packaging requirements

Sylvania cellophane is serving many war uses

SYLVANIA INDUSTRIAL CORPORATION

General Sales Office: 122 East 42nd Street, New York 17, N. Y.

Works and Principal Office: Fredericksburg, Virginia

*Trade Mark Reg. U.S. Pat. Off.

**Foresight in
PACKAGING**

calls for

Clearsite

CONTAINERS



DRUGS
PHARMACEUTICALS
DIETARY PRODUCTS
DENTAL SUPPLIES

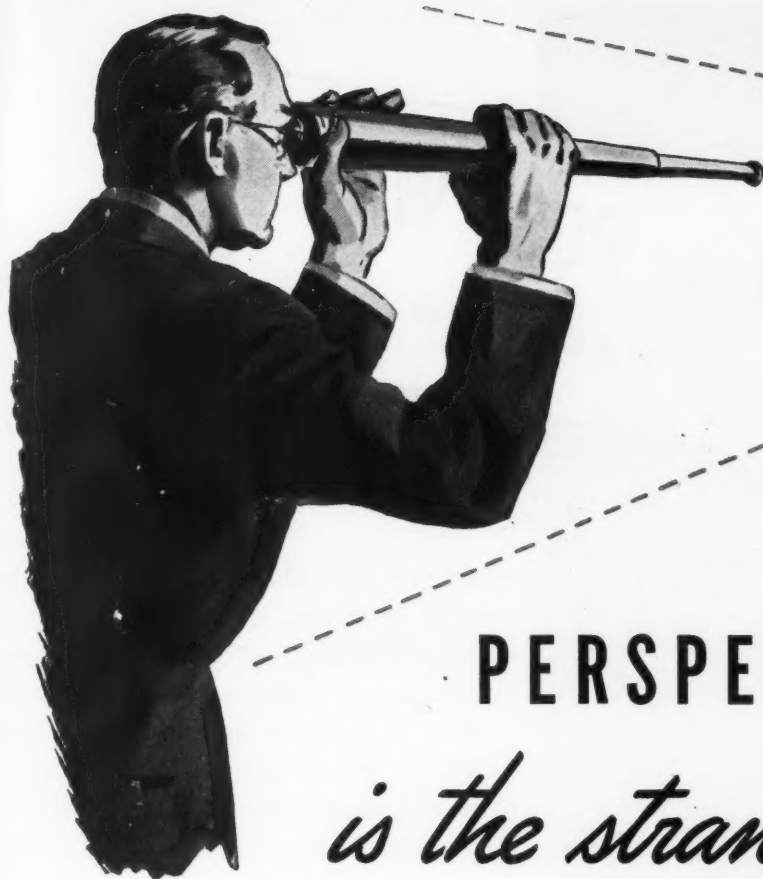
There is *extra* protection for products packaged in CLEARSITE . . . *more* than mere *quality* protection . . . CLEARSITE survives handling and accidents which would totally ruin less resilient containers as well as their contents. CLEARSITE, process-labeled direct upon the container protects against counterfeiting of valuable brand names. Test samples—and SEE for yourself! Our Engineering Department is at your Service.

FIRST IN
CELLUPLASTICS
HYCOLOID-CLEARSITE

CELLUPLASTIC CORPORATION

60 AVENUE L

NEWARK, N. J.



PERSPECTIVE

is the strangest thing

YOUR BATTLE STATION

Every time you eat a meal, you're at a battle station, fighting to save food to feed our fighting men. Remember, the Army fights on its stomach, so let's make sure to furnish them with all the food they need, by conserving our home supply. That way, you'll help food fight for freedom.

Take one of your packages, for instance. To you, it's mighty important. But as it gets farther away from home base, in the hands of wholesaler, retailer or customer, that importance diminishes. To them, it's just another item to be bought or sold.

Dobeckmun Packaging Engineers like to use the customer's perspective when they're designing packages. If your package can signal "come and get me" and then deliver your product in perfect condition, that's the one for you.

We've proved to a lot of people that our converted cellophanes, laminated films and foils deliver both eye appeal and product protection. While we're doing our share of War work right now, our engineers have time available for planning future packages with customer perspective. We'd like to work with you.

THE

DOBECKMUN

COMPANY

CLEVELAND, OHIO

OAKLAND, CAL.



LET'S SAVE for POST WAR

BY CUTTING WASTE NOW

If the war is won when you read this—if it isn't won for months to come, efficient cartoning remains a leading problem for industry. Material scarcity demands it!

The protection, identification, sales value of cartons are qualities always in need of improvement. The more these features are stressed the fewer the lavish details and the greater the saving in materials. Cut out the waste and your package becomes more efficient—more welcome by the consumer.

It is possible now for Ridgelo Clay Coated products to contribute to your plans. Finer finishes that use less ink, less valuable-fiber content, linings to protect, rigidity with light weight and minimum thickness—these are some of the advantages of Ridgelo Clay Coated. They are good reasons *now* for using Ridgelo—they will be equally good in your carton plans at *any time*.

Ridgelo ★
 CLAY COATED
REG. U. S. PAT. OFF.
 PAPERBOARDS FOR CONVERSION AND ESSENTIAL USES
 MADE AT RIDGEFIELD, N. J.
 BY LOWE PAPER COMPANY

GET THE WASTE IN...
 AND THE WAR PACKAGES OUT

Representatives: E. C. Collins, Baltimore • Bradner Smith and Company and Mac Sim Bar Paper Company, Chicago • H. B. Royce, Detroit
 Gordon Murphy and Norman A. Buist, Los Angeles • A. E. Kellogg, St. Louis • Philip Rudolph & Son, Inc., Philadelphia

WHEN YOU



THINK ABOUT IT

As a user of glass containers there are doubtless many interesting things about Carr-Lowrey that may not have occurred to you.

For example, while we're not the oldest glass manufacturer in the business . . . we *have* been making quality glass containers for more than 50 years!

And while we are not numbered among the largest glass manufacturers in America . . . hundreds of well known drug, cosmetic, food and household products *are* enclosed in Carr-Lowrey containers.

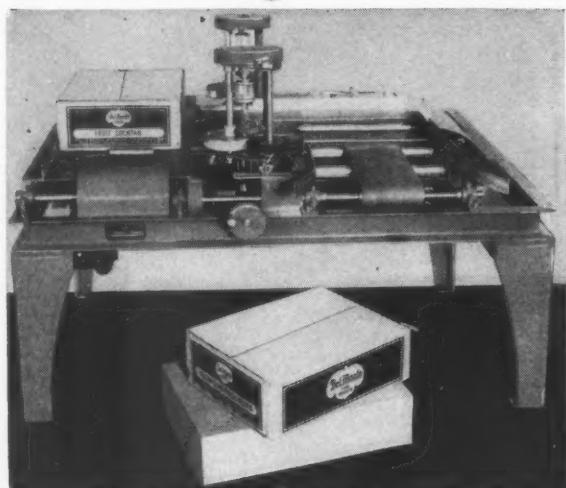
In fact, when it comes to the manufacture of glass packages specifically designed to meet your particular need efficiently and economically, the excellence of Carr-Lowrey products will be found to equal or exceed similar containers manufactured elsewhere!

That is because every order that we receive is accorded the most painstaking treatment by skilled workmen, jealous of their hard-earned reputation for top quality craftsmanship in every detail.

Worth considering, isn't it . . . **WHEN YOU THINK ABOUT IT.**

**CARR-LOWREY
GLASS CO.**

Factory and Main Office: BALTIMORE, MD. New York Office: 500 FIFTH AVE. Chicago Office: 1502 MERCHANDISE MART



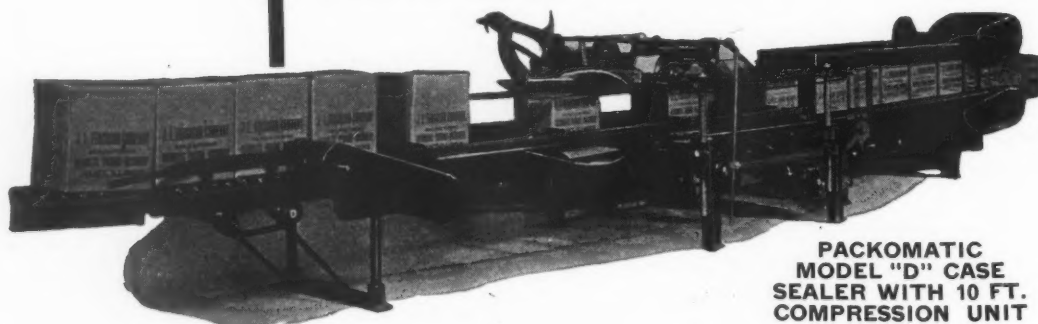
**PACKOMATIC
AUTOMATIC
PAPER CASE
PRINTING
MACHINE**

**THESE MACHINES
ARE HELPING WIN
THE WAR!**

The operation of the Packomatic Case Printer is entirely automatic. Saves warehouse space, eliminates use of stickers and saves excess handling.

It will print both ends of the case simultaneously, after the case is filled and sealed as you use them. Prints one or two colors, and from one to seven lines of type. Or it may be furnished to print both ends and both sides of the container.

Packers who use glass containers will find great economy in using these machines. No regular operator required. Adjustable for a wide range of case sizes. Operates up to 20 cases per minute.



**PACKOMATIC
MODEL "D" CASE
SEALER WITH 10 FT.
COMPRESSION UNIT**

*For Automatically Sealing All
Types of Paper Shipping Containers*

The Packomatic Model "D" is carefully designed to automatically seal the Government "V" cases, or any other type of paper shipping containers, giving continuous low-cost operation at any required speed. It will meet your requirements for

automatic sealing of both top and bottom flaps simultaneously, or it may be equipped for either top or bottom sealing only. No regular operator required. Easily adjustable for different sizes.

We can only supply equipment to essential industries who can furnish suitable priority. We are now accepting orders for post war deliveries.

**OTHER
PACKOMATIC
MACHINES**

Shipping Case Sealing Machines
Consecutive Numbering Machines
Carton Sealing Machines
Auger Packers
Paper Can Tube Gluers
Dating Devices
Paper Can Tube Cutters
Paper Can Shrinking Machines
Paper Can Labeling Machines
Shipping Case Printing Machines
Carton Making Machines
Automatic Volumetric Fillers
Paper Can Set-up Conveyors
Paper Can Label Dryers

PACKOMATIC
PACKAGING MACHINERY

J. L. FERGUSON COMPANY, JOLIET, ILLINOIS

REPRESENTED IN ALL PRINCIPAL CITIES

FIGHTING THE FOES OF HUMANITY



...in War and Peace

★ In war—by protecting vital supplies to our armed forces. In peace—by protecting consumer goods against contamination. Our multi-printed Cellophane and Glassine bags and wrappers for food and other products mean sanitation, eye-appeal and increased sales.

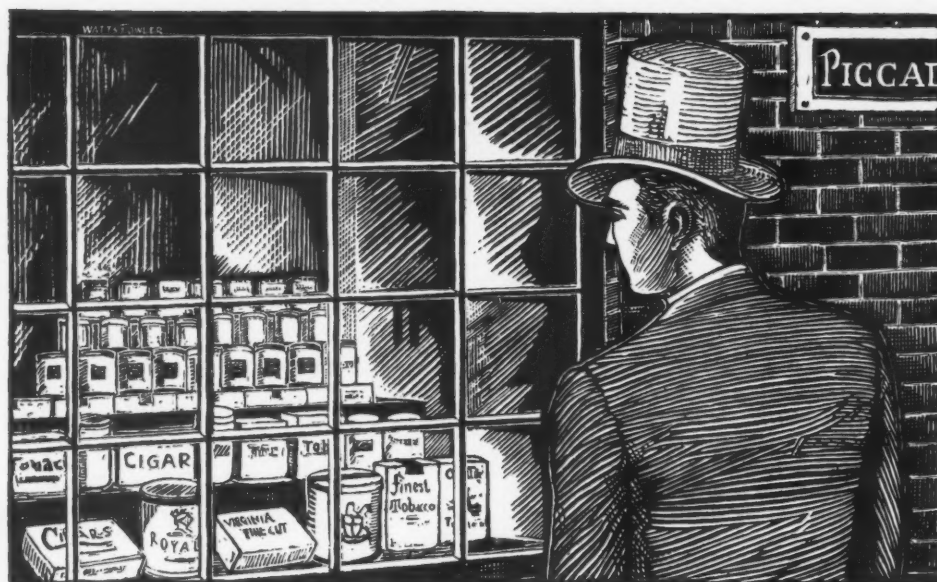
Pioneering a better way of life is the American habit. Whatever your product, we, as pioneers in modern packaging, can help you plan an improved package for your present or post-war use.



Traco-Packs • Traversheen • Traverwrap • Cellophane Bags
"Tite-Seal" Liners • Multi-Color printed Cellophane and
Glassine in Sheets or Rolls • Loxtite Fillers • Dividers

TRAVER CORPORATION

358-368 W. Ontario St. • CHICAGO, ILLINOIS • 404 N. Sacramento Blvd.



Richard Wright Took a Walk . .

Fifty years ago Richard Wright, while strolling along Piccadilly Circus in London, saw a package of machine-wrapped tobacco. Instantly, he visualized what this could mean to the tobacco industry of America.

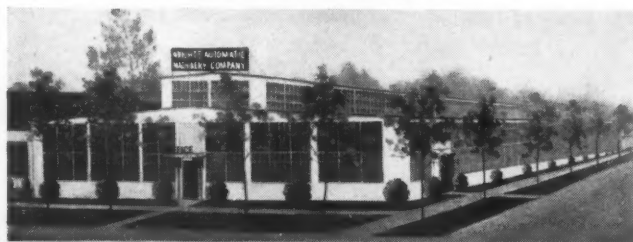
Wright hurried home, put his ideas into action, and the Wright's Automatic Machinery Company was born. Tobacco packaging in this country was revolutionized.

In the years that followed, refinements were made and new developments added that opened up opportunities in other fields. Up to 1941 Wright's Automatic Machinery Company was designing and manufacturing automatic packing, bagging, wrapping and labeling machinery for a growing list of companies in the food, liquor, tobacco and other industries.

Since 1941 Wright's Automatic Machinery Company has been supplying precision instruments to the United States Navy. This important experience will, one day soon, be expressed in terms of solving packaging problems for post-war marketing. Our engineers and designers are available now for consultation with firms interested in modern equipment for packaging, wrapping, labeling, stamping, or bagging, of their products.



~ 1893 - 1943 ~



Packaging Engineers

T. D. WRIGHT, President

R. H. WRIGHT, JR., V. P. & Treas.

WRIGHT'S AUTOMATIC MACHINERY COMPANY
DURHAM NORTH CAROLINA, U. S. A.

CABLE ADDRESS YONWRIGHT

*YESTERDAY...An Expert
Metal Lithographer...*

*TODAY...An Expert
Rifleman...*

From the big Heekin factories men have gone forth in all branches of the service—and on all fronts—to do their share toward winning this war. There are expert lithographers who today are expert riflemen; traffic men who fly in bombers; salesmen who ride in tanks and production men who ride the seas on battle-wagons . . . and when this war ends, they'll be back with the Heekin organization ready and anxious to carry on again with your peace time packaging problems. Remember, metal packages . . . square, round or oval . . . do a better job. Heekin Lithographed Cans have been famous for lasting colors . . . colors that harmonize . . . colors that sell merchandise. The Heekin Can Co., Cincinnati, O.



HEEKIN *Lithographed Cans*
WITH HARMONIZED COLORS

THIS IS A COLLECTION OF SAMPLES OF JUST SOME OF THE PRODUCTS PACKAGED BY S&S MACHINES



We've done our share of America's packaging, too

In many lines, the bulk of production of the industries is S&S packaged. . . . In many more, the job is split about evenly between S&S and others. . . . In almost every industry where the material to be packaged is a powder, granular substance or paste, S&S has supplied a goodly percentage of the packaging machines.

This is easy to understand when you

TODAY — WE'VE FOUND FOUR NEW WARTIME WAYS TO SERVE:
We supply many essential new S&S machines . . . and help convert old S&S equipment to wartime uses. And, drugs and chemical products for the armed forces and the home front — munitions — a vast number of familiar foods and a large percentage of the new dehydrated foods — a hundred other war-important items — are speeding through production faster, in greater volume, because of this.

We are helping, too, in solving war's new and

remember that, in many cases, it has been S&S improvements that have made the advances in packaging technique — that have made practical many better packages at lower unit costs. Further, it has been S&S developments, like that of the first tight-wrapper, that alone have made possible many new triumphs of modern packaging.

unfamiliar packaging problems, through close collaboration with many packagers.

And, we are doing this in addition to production direct for the United States Government, at whose disposal our facilities have been placed.

ONE OTHER JOB WE WANT —

If you have a packaging problem that's war-essential, bring it to our engineers. We'll help any way we can, so long as it contributes toward Victory.

A GOODLY PERCENTAGE OF
AMERICA'S FAMOUS PRODUCTS
ARE PACKAGED ON

S & S Filling Machines

**S & S Carton Filling and
Sealing Machines**

**S & S Bag and Envelope
Fillers and Sealers**

S & S Tight-Wrappers

**S & S Complete Packaging
Line**

STOKES & SMITH CO

Frankford, Philadelphia 24, U. S. A.

FILLING • PACKAGING • WRAPPING MACHINES

Gair by Air



One million planes will be in active service by

1950, reports the Civil Aeronautics Adminis-

tration, sure indication that the cargoes of

the future will go by air—Gair con-

tainers have proven to be ideal where

weight is the first consideration

... Consult our engineers

Robert Gair Company, Inc.

New York—Toronto

*Save Waste Paper
for War Production*

FOLDING CARTONS • BOXBOARDS • FIBRE & CORRUGATED SHIPPING CONTAINERS

PRODUCTS THAT STAND OUT... SELL OUT

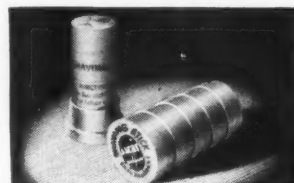


These colorful Don Juan plastic lipstick containers are decorated with little Decal figures of soldiers, sailors, etc., for the patriotic girl. A product of Don Juan, Inc., 67 Vestry St., New York.

DECORATE PACKAGES WITH

MEYERCORD DECALS

Modern packages deserve smart, modern nameplates and decoration. Investigate the unlimited effects in color and design obtainable with genuine Meyercord Decalcomania. Any trademark or decorative design, in any number of colors, can be reproduced in any size—for application on glass, wood, plastic, glazed crockery, etc. Special production line techniques provide speedy, economical application on flat or curved surfaces. The durability of Meyercord Decals protect your brand-mark for the life of the product... and serve as permanent salesmen for repeat purchases. Free designing service. For full details write Department 812.



The trend in modern package identification and decoration is to Meyercord Decals. Solon Palmer, Inc., New York, N. Y. identify the cleverly designed blond wood container of their famous ASCOT Shaving Soap with a multi-colored Meyercord Decal Trademark (brown, yellow and red) as illustrated above. Remember...if your product stands out... it sells out!

**World's
largest producers of
DECALCOMANIA**

Back the Attack... Buy War Bonds

THE MEYERCORD CO. CHICAGO

Main plant and general offices: 5323 WEST LAKE STREET, CHICAGO 44, ILLINOIS

Sales offices in principal cities of U. S. A., Mexico and South America



May Christmas always bring Joy
to the hearts of the Young....
Peace to the hearts of Men



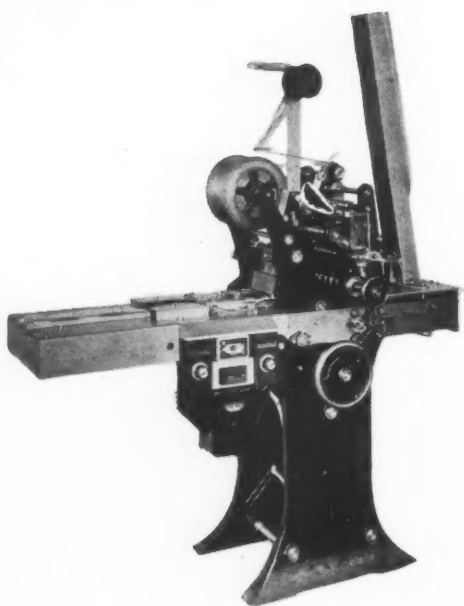
HAZEL-ATLAS GLASS CO.
WHEELING, W. VA.





FLYING FORTRESSES
ARE POWERED BY
WRIGHT CYCLONES

*Scandia helps
to 'Keep 'em Flying'*



Scandia packaging equipment keeps freshness *in*—and keeps moisture *out*; protects foods, drugs, fruits, cigarettes, cosmetics, etc. Descriptive circulars are available . . .

Instead of packaging *other* products, the fruits of our labors are now an essential part of the "package" shown above. The engineering and production skill of Scandia is "on the War-path"—an understandable reason why Industry must wait.

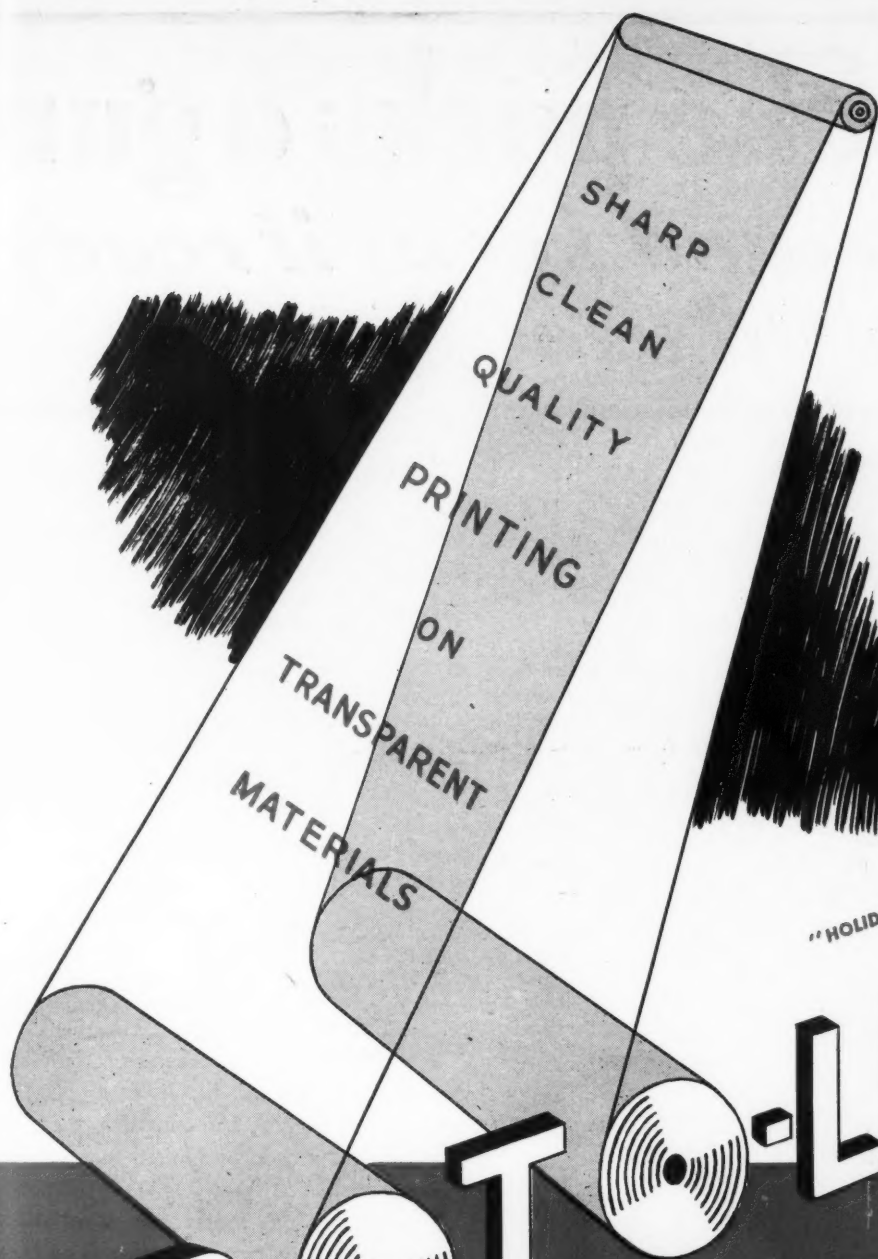
*~but watch Scandia spurt
on PACKAGING EQUIPMENT
when "V"-day comes along——*

Because Scandia cellophane tite-wrap packaging machinery has always embodied all the Industrial essentials of SPEED, PERFORMANCE and SIMPLICITY for 'round-the-clock' production, inquiries for post-war delivery are already on the books.

***Scandia* MANUFACTURING CO.**

NORTH ARLINGTON

NEW JERSEY



"HOLIDAY GREETINGS
TO ALL"

ROT-LITH

*...printers
of*

CELLOPHANE ACETATE AND
FOIL PAPERS *...rolls and sheets*

WRAPS *for*

CANDY
SPAGHETTI
MACARONI
BACON
BREAD
CAKE
FISH
CIGARS

and other products

CONVERTERS OF

ROT-LITH Ltd

15 W. 18TH ST., NEW YORK 11, N. Y.



She packs a gun ..and keeps it ready to use



It's a U.S. Army pistol—the famous Hi-Standard .22 Automatic Long Rifle.* And it reaches the eager hand of some soldier, *ready for action*, thanks to a specially designed, rugged, anti-corrosive, grease-proof container made by United States Envelope Company.

Here is one more example of the individualized protective containers by U. S. E. that are carrying sulfa drugs and bayonets, field rations and ack-ack gun parts and many other Ordnance and Quartermaster Corps materials . . . protecting and delivering them ready for action.

Your protective packaging problem of the present or the future, military or civilian, can perhaps be solved now by some war-created U. S. E. development applied to your individual needs . . . or by the creation of something entirely new.



*Manufactured by
The High Standard
Manufacturing Corporation,
New Haven, Conn.

UNITED STATES ENVELOPE COMPANY
General Offices
SPRINGFIELD 2, MASSACHUSETTS

U*S*E *protective packaging*

Products of United States Envelope Company include WAR PRODUCT PACKAGING • TRANSPARENT CONTAINERS • ENVELOPES
WRITING PAPER • LINWEAVE PAPERS • NOTE BOOKS • PAPER CUPS • TOILET TISSUE • PAPER TOWELS



SPRING IN THE CITY

Gift from Grant Wood... and us

Each year during the holidays, it has been our past custom to send our friends a keepsake, something we thought worth the semi-permanence of fine reproduction. This year, in a world woefully short of paper, the annual sentimental gesture seemed inept.

A few weeks ago, however, the men in the shop began to ask about the "Christmas job." Then the stockroom reported a leftover of fine paper, too little for a commercial job. And our Bill Scoble, connoisseur of the fine as well as the commercial arts, saw a Grant Wood painting, and coveted it. But the painting was already en route

to the museum which had paid some \$40,000 for it. Scoble thought of the only substitute—a reproduction. The owners gracefully gave permission...

SO THIS YEAR it is our pleasure to present a reproduction, faithful to the best of our collective abilities, of Grant Wood's "Spring In The City."

For fifteen years, Grant Wood tried to find his soul and metier in France; and like the novelist, Thomas Wolfe, found America. He came home to paint his own country in his own way. "American Gothic," the art sensation of the Chicago World's Fair Exhibit,

was first resented by his native Iowans as insulting, but has become a best selling print. Wood's last few years, were largely spent in teaching art, which limited his own output.

"SPRING IN THE CITY" is a simple and homely scene in the soft colors Wood usually worked. It has a peculiar timeliness just now, when so many city dwellers find new satisfaction in the soil, and new food resources, in their Victory Gardens... If you have not been on our lists in the past, and would like a copy, we shall be happy to send one while the edition lasts.

Einson-Freeman Co., INC. • OCCASIONALLY ALTRUISTIC LITHOGRAPHERS

STARR AND BORDEN AVENUES, LONG ISLAND CITY, NEW YORK

IT'S A "PACKAGED" WAR

● The development of packaging by American industry deserves much credit for the success of our armed forces at fabulous distances from the sources of supply. War materials that have run the gauntlet of enemy submarine and air attacks for thousands and thousands of miles would be useless if not finally delivered in good condition.

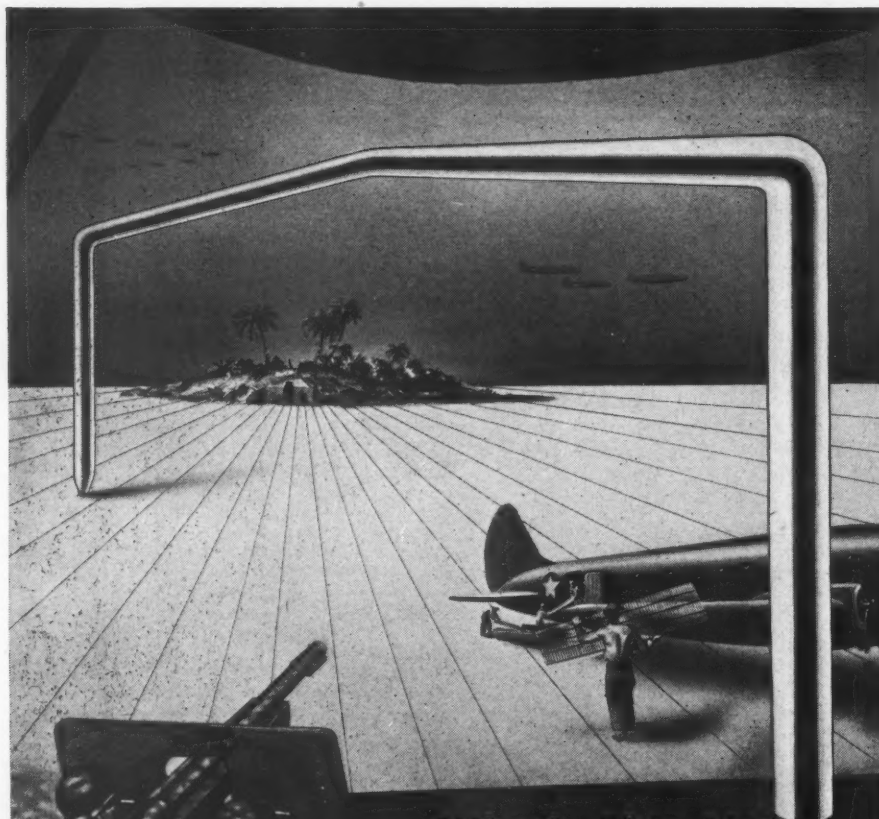
With thousands of different items, from bullets to airplanes, now being packaged for the largest armies ever conceived, the demand for the materials and methods of war packaging alone exceeds the total of any previous peace-time packaging. And there still remain very large packaging requirements for essential civilian use.

Not only are the demands extensive but the requirements are unusually difficult. Shipments must be protected against the humid heat of the Solomons, the furious cold of Iceland and the Aleutians, the sand-laden winds of Africa, and the corrosive salts of the seven seas. Protection, too, must be provided against insects which can enter the tiniest crevice or eat through the toughest non-metallic material.

In spite of this overwhelming demand and the difficult requirements, Bostitch has tried to take care of as many civilian needs as possible. Bostitch will increase its production for civilian uses as rapidly as increasing supplies will permit without lessening its one hundred per cent effort to help win the war.

Some of the interesting applications of Bostitching in packaging for military use are listed below, to illustrate the essentiality of this work:

- Tacking padding to cradle of bomb box;
- Sealing powder bags;
- Fastening canvas covers on machined end of steel pipe;
- Tacking zinc tags on shipping cases for war zones;
- Sealing waterproof bags to protect delicate instruments;
- Sealing bags of moisture-absorbent chemicals for packing with delicate metal instruments, to prevent rust from moisture in the air;
- Making grommets to protect rotating bands on large calibre shells;
- Assembling boxes for hand grenades, ammunition, bomb fins, fuzes, clothing, food, and other ordnance, quartermaster, and medical supplies;
- Tacking oil paper and felt linings into large wooden boxes for shipping wings and fuselages.



What's This Little Bostitch Staple Doing in the Combat Zone?

CONTRIBUTING vital speed to hundreds of important projects...from the paper work in the commanding officer's tent...to the linking of portable landing fields...

Speed with tiny desk fasteners...speed with powerful tools and huge staples for assembling the "iron carpets" which make smooth landing areas on uneven ground...speed with hammers and tackers which help build barracks and hospitals...

Back home, Bostitching also serves the war, solving new fastening problems in war plants...continuing its time-saving work in war-converted civilian plants...manufacturing camouflage nets, attaching deck covering on landing craft, steel-stitching sheets of aluminum for planes.

This war is proving on thousands of applications that Bostitch fastens it better with wire...and is also responsible for many new techniques and uses which speed-minded manufacturers will welcome, since the war is won.

The Bostitch line — unrivalled in completeness — makes it possible to select the right combination of machine and staples for each job. If you have priorities...or want to build Bostitching into your post-war plans, investigate now.

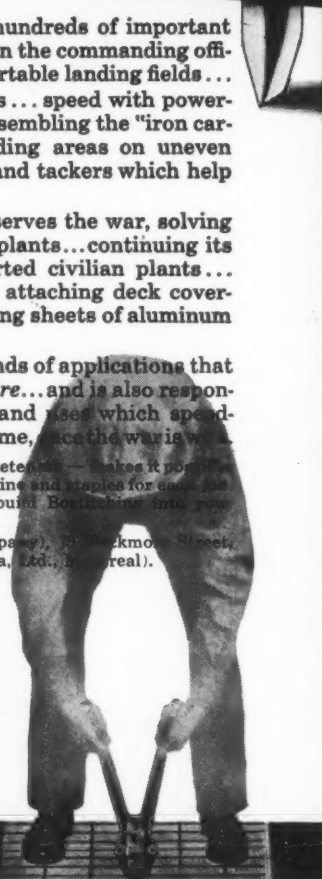
Bostitch (Boston Wire Stitcher Company), 15 Backmore Street, East Greenwich, R. I. (Bostitch-Canada, Ltd., Montreal).

Right: A special Bostitch war tool.

BOSTITCH

AND FASTER
fastens it better with wire

ALL TYPES OF STAPLES APPLIED BY MACHINES
ALL TYPES OF MACHINES FOR APPLYING STAPLES





Paper takes a waste measure

DAY BY DAY the need for wood pulp mounts.

Long ago the paper and pulp industry took on far greater responsibilities than the routine office supplies of war — forms, books, bonds and stamps by the billion.

Wood pulp today is a vital material of war.

It is used in producing hand grenades, gas tanks, camouflage, ammunition boxes, and hundreds of other fighting aids. It is molded into airplane wing tips. It is impregnated with resins and pressed into metal bearings and gears.

The need is so great that the paper industry is salvaging waste paper and paper board at the

rate of 500,000 tons a month. As a matter of fact, it has never stopped trying to protect its source of supply. While the needed lumber jacks are lacking, vigorous salvage campaigns are helping enormously to supply paper fiber and to make up for steady deficits in virgin pulp. The results have been valuable to every phase of the war effort.

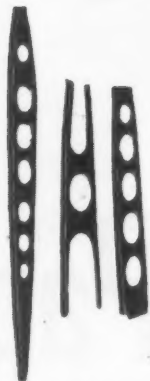
Making a thousand miles of paper a day, as we do, we are in close touch with every need and development in the industry. We know that waste paper will play an important part until peace is ours. Save your paper waste and do it methodically. *Get in touch with your local salvage committee!*

OXFORD PAPER COMPANY

EXECUTIVE OFFICES: 230 Park Ave., New York 17, N. Y.
WESTERN SALES OFFICE: 35 E. Wacker Dr., Chicago 1, Ill.
MILLS AT: Rumford, Maine; West Carrollton, Ohio



TURRET GUNNER'S SEAT



WING-TIP RIBS

Made with

PAPER

X

A wing-tip rib or an ammunition box may seem to have little bearing on your urgent need for protective packaging papers for food at home and abroad.

X

But Riegel-X, our new group of impregnated base papers for plastic laminates, is only one of the reasons why we cannot serve all our customers, with all they want, all the time. Paper is being used to replace many other materials in vitally needed products—and our mills and laboratories are under a heavy strain for we are one of the largest manufacturers of special industrial and protective papers.

X

We are doing our best to serve you within the necessary limitations imposed upon us. Where we cannot supply you adequately, we will gladly help you by recommending substitutes or other sources of supply. Riegel Paper Corporation, 342 Madison Avenue, New York 17, N. Y.

RIEDEL-X

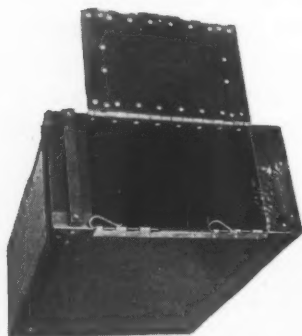
A group of plain and impregnated base papers for both fluid and direct pressure plastic laminates.



STEP ASSEMBLY



FLOOR PIECE



AMMUNITION BOX

Photographs courtesy of McDonnell Aircraft Corp.

M-M-M... A DIFFERENT
PACKAGE... BUT I CAN
SEE IT'S THE SAME
GOOD BRAND!



Don't Sacrifice Familiar Features When Changing to a Wartime Package!

When you are forced to switch from the old, familiar container to a different package, be sure to preserve those valuable recognition features you have established over the years.

Let us show you how easy it is to retain your brand name, trade-mark and other

identity characteristics in their established colors and design, even though the package itself undergoes a revolutionary change in materials, style, size or shape.

As one of the world's largest producers of packaging materials and fine Full Color Lithography, we offer you the benefits of experience, skill and ability to produce packaging of various types in sparkling Full Color at surprisingly modest cost. Write us today.

FREE!

Our 28-page book — "The Value and Patriotic Use of Full Color" tells how to get beautiful results at low cost. Write today for your free copy.

Contractors to the Government—War Work Comes First!



For over 75 years—headquarters for high-quality, colorful, lithographed labels, box wraps, packets, folding boxes, cartons, merchandise cards and envelopes, displays and advertising materials.

STECHER-TRAUNG

LITHOGRAPH CORPORATION

Rochester, N. Y.

San Francisco, Calif.

Offices in Principal Cities

SOLVED! Another Metal Replacement Problem



THE thousands of pounds of metal formerly used by Durkee Famous Foods for their Shortening package are needed for the war effort, so Durkee has adopted the metal replacement unit illustrated.

The rigid fibreboard carton is laminated inside and out with Du Pont Cellophane. A heat-sealed Cellophane disc provides a completely airtight closure, held solidly in place by the removable fibre lid.

This lightweight, leak-

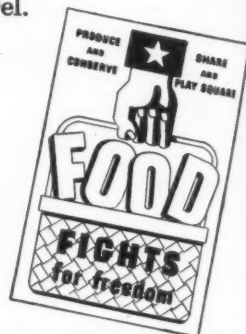
proof, easy-to-handle package keeps the product in splendid condition. The filling operation is speedy and easy. Durkee has found that—both in the factory and in the consumer's kitchen—this new container is superior in many ways to metal containers formerly used.

If you have a metal replacement problem, perhaps we can be of assistance.

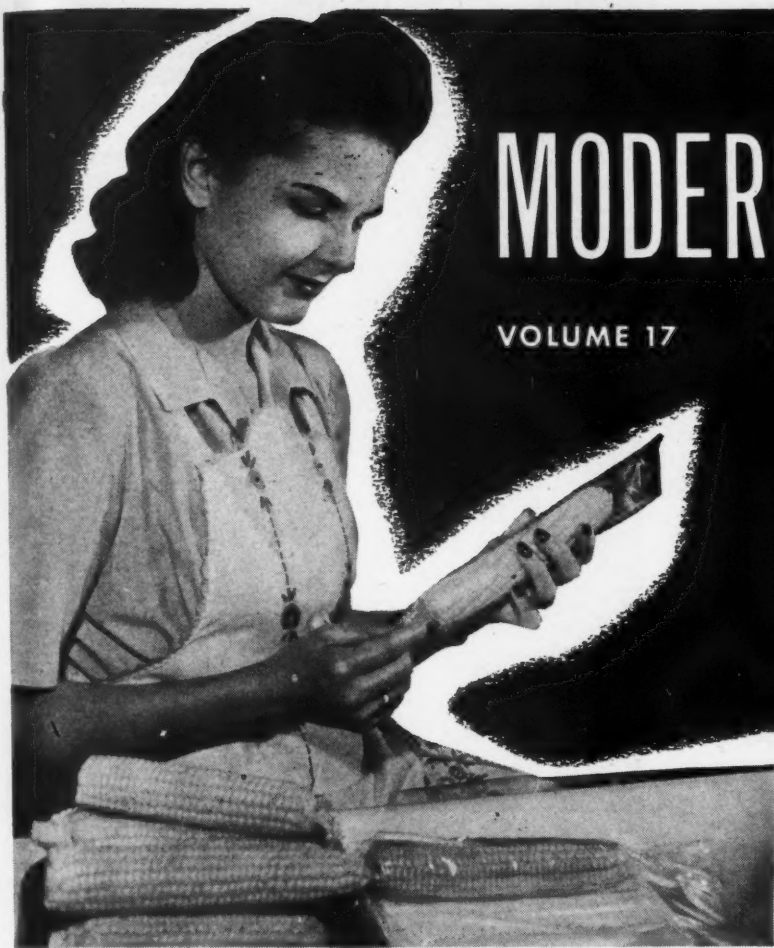
E. I. du Pont de Nemours & Co. (Inc.),
Cellophane Division,
Wilmington 98, Del.



Du Pont Cellophane



BETTER THINGS FOR BETTER LIVING...THROUGH CHEMISTRY



MODERN PACKAGING

VOLUME 17

DECEMBER 1943

NUMBER 4

In thousands of frozen-food lockers, modern, moistureproof heat-sealing materials this year are keeping Victory Garden produce fresh for Christmas dinner. Nearly 1,500,000 housewives already are doing this new kind of packaging.

FROZEN VICTORY GARDENS

—a new trend in packaging

War and the victory garden have created something brand new in the packaging field.

Millions of American housewives have learned to package their fresh fruits and vegetables in cellophane bags and paper-board boxes for quick-freeze storage in locker plants or home freezers—and for the first time the housewife has become a direct, major consumer of paper packages. She is being made package-conscious.

The implications of this trend are tremendous:

Will it cut into the volume of commercial processing of foods in the normal, peacetime economy?

Will the production and sale of the traditional food-packaging materials (glass and tin) be affected?

Will the channels of normal food distribution and merchandising be disrupted?

Will the locker plant drop its servicing or packaging functions and become purely a storage place for home-packaged foods?

Answers to some of these questions are clouded in postwar uncertainty, but there are certain facts and certain obvious signs and portents that should be carefully noted.

Heavy military demand on a limited supply of canned goods has spurred the victory garden program and, in turn, all types of home packaging and preservation of produce. The familiar home canning in glass jars has shared in this boom. But—is this purely a wartime phenomenon due to subside after the war to the previous ratio of hot-packing to freezer preservation methods? When rationing ceases will the grocer's canned foods be in normal, prewar demand?

There are good indications that things will not be the same. The housewife has learned that foods properly quick-frozen and properly packaged can be superior in freshness and flavor. She has learned the economy of doing her own processing and packaging. Perhaps most important of all, she has in the last year found available excellent moistureproof bags and cartons especially designed for her, for easy and effective home packaging and sealing.

The new "locker packages," in pint, quart and two-quart sizes, are equal in every way to the best that has been used by the commercial quick-frozen food industry. In combination with the locker or home freezer, they bring to a new high the ease and convenience of home food preservation. They

make available frozen foods at a cost with which the commercial industry cannot hope to compete. Except for the job of butchering and wrapping meats and large pieces, they seem to obviate the packaging services which the locker operator has heretofore usually provided.

Several manufacturers are now actively promoting various types of unit packages for home packing and subsequent freezing. Most of them are bag-and-box combinations; some are bag alone or box alone, but all have these things in common: a high degree of moisture-vaporproofness and ease of filling and sealing. The heat seal is effected by the housewife with her curling iron or flat iron.

HOME-USE MATERIALS

As shown by accompanying illustrations, many of these packages have been dressed up with attractive printed designs and instructions. Some have "windows" so that the contents may be identified at a glance. Most of the boxes are shipped flat with or without the cellophane inner bag inserted.

One of the attractive window containers is a bag-in-box arrangement (Fig. 2). Specifically designed for home use, the carton has step-by-step instructions for assembling, filling and sealing printed on the back panel. The bag of lacquered cellophane is spot-glued to all sides of the carton to facilitate a wide opening for filling when the box is squared up. Except for the top opening, the bag is presealed with duplex heat-sealed seams. A dotted line marks the filling level on the box and the bag is closed by the user either by making a simple cross seal with an electric curling iron or flat sealing on a tabletop with an ordinary flat iron. The rectangular, space-conserving box comes in pint and quart sizes, two pints nesting in the same space as one quart. Simple notched tuck-end locks hold securely when pushed into position.

A similar box, furnished in pint and quart sizes is shown by Fig. 4. This box also has an attractive printed color and



1—Peaches are sliced fresh into cellophane bag inside window box, then covered with syrup. 2—Cellophane is easily heat sealed with the housewife's curling iron.

design, including illustrated directions. It is supplied with the cellophane bag, presealed at side and bottom, ready to be inserted in the carton by the user. The lengthy flap on the bag may be heat sealed as above or closed simply by twisting and tying. The carton itself, wax-coated, is said to be moistureproof and airtight, and its lock flaps may be sealed with an iron. A dewaxed space on one flap provides for identification of contents. The manufacturers report that best results are obtained when the separate cellophane bags are wrapped in a warm wet cloth at least 24 hours before use.

Another type of box (Fig. 5), depends entirely upon the box for protection and has no separate bag. A new thermoplastic coating applied to the box makes it liquid-tight and is said to reduce dehydration by inhibiting moisture-vapor transfer through the walls. The same coating provides a heat-seal closure of the triple top flaps, effected by the housewife with a flat iron. The triple-sealed bottom is constructed of three layers of flaps cemented firmly together under pressure. This box, made square to minimize upsets in the locker, is shipped set up and closed to assure cleanliness. It is reusable, the manufacturer says.

One type of plain, undecorated paperboard box (Fig. 6) is shipped flat with separate No. 300 MSAT cellophane bags to be inserted. The box is .025 special kraft lined board. Available in three sizes—about $\frac{2}{3}$ quart, a heaping quart and about $1\frac{1}{3}$ quarts—it is sold in units of 100. When the bags are heat sealed by a curling iron, the package is said to be airtight and moistureproof.

An example of the bag-alone package is shown in Fig. 7. This bag of paper laminated with cellophane—or in normal

times with pliofilm—is simply filled and sealed with a flat iron and is said to give good air and moisture protection to the contents.

The separate cellophane liner provided with some boxes has an advantage in that the outer container often may be re-used.

Other materials currently used in frozen-food lockers are wax-coated cylindrical containers, so-called locker paper which is a wet-strength paper wax-coated on one side, and glassine and parchment laminated bags. For use by locker-plant operators and others in wrapping of meat and large pieces, moistureproof cellophane is supplied in rolls in cutter boxes.

The special locker boxes and packaging materials are sold by locker plants, often at cost, and by paper supply houses and dealers in freezing equipment. They may soon find their way onto the shelves of hardware and grocery stores as a regular item. Consumers now in some cases may order direct from the manufacturers in bulk quantities.

It was revealed at the recent Des Moines convention of the National Frozen Food Locker Assn. that there are now 4,780 locker plants in 47 states, handling more than a half-billion pounds of meat, poultry, fruit and vegetables a year. Most of these plants are concentrated in the Middle West and Pacific Northwest, with Iowa (550) and Washington (375) topping the list. Increase has been rapid in the last two years in sections where previously there were few plants, particularly in urban areas.

The average locker plant has 500 lockers. This indicates a total of at least 2,390,000 families now patronizing the locker plants. It is estimated that by 1948 there will be 10,000 plants. If the average of 500 lockers to the plant is merely maintained, that means that 5,000,000 families will be participating.

In addition, there are nearly 60,000 home freezer and frozen storage units in use. Machinery shortages have retarded their manufacture during the war; demand far exceeds the supply, and after the war their sales are expected to mushroom. In the meantime, there are reported instances of ice-cream cabinets having been removed from soda fountains and carted off to freeze beans and chickens for this winter's table.

Not only vegetables and fruit, but cut-up poultry also is being packaged in the new home containers, heat sealed and then frozen. Dressed poultry and large cuts of meat are wrapped in sheets of cellophane usually cut from a roll.

Baked beans, chili con carne and even mince pie are today going into farm freezers along with eggs and dairy products. Apples, broccoli, brussels sprouts, cauliflower and cranberries are successfully frozen.

HOUSEWIFE'S OPINION

A typical housewife who has turned to packaging her own produce for freezing states that she did so after finding "plenty of faults" in the materials and packages offered at the locker plants. Nevertheless, queried as to probable effect of the freezing trend on canned and other packaged foods after the war, she declares that, "Many housewives will have learned that locker freezing is easier than home canning and that fresh garden stuff when frozen—if properly handled—is better than canned food. They will also have learned that home gardens mean work. They may decide to buy commercial frozen foods and forget about preserving their own. But personally, I don't see how any housewife who has become

accustomed to her own nice, clean packaged meat, cut as she wants it, can ever go back to the careless, untidy meat handling of the average butcher."

Competent observers appear to agree that the locker operator has been somewhat at fault in failing to keep step with packaging progress. Until very recently, the packaging methods of most locker plants were deficient in the all-important point of moisture-vaporproofness—far behind the commercial quick-freezing industry in this respect. In a way, the housewife has helped to bring about recent development of locker packages by insisting on a freezer package as good as that she found in the store.

WHICH WAY EXPANSION?

The locker plant trend probably will be in the direction of large-scale expansion of freezing and storage facilities with diminution of preparation and packaging facilities as the latter activities move directly into the home. In volume of business the locker-plant industry is destined for steady growth. Servicing facilities may not be entirely dropped, for there has been developed recently one small but interesting trend: participation by urban families and apartment dwellers who simply buy large quantities of produce at the most favorable market price and take it to a locker plant to be processed, packaged and stored against future withdrawals.

Locker-plant growth may, however, be affected to some extent by increasing use of deep-freeze units in the home, a practice which in some cases knocks out the locker plant entirely. Large home freezers will hold several months' food for a moderate-sized family. If the home freezer's facilities are inadequate for long storage, it still may be used for the original freezing of food packages and for spot storage of supplies as they are withdrawn from locker storage.

One way in which locker plants may make up for loss of

3—Into the family's freezer locker goes produce of the victory garden, neatly packaged against dehydration.



business on processing for home consumers is by engaging in processing on a commercial scale. This is already being done and the practice seems to be increasing. Many plants in the Midwest are receiving frozen foods in bulk quantities from the coasts and re-packaging it in consumer units to be sold to locker clientele. Frozen fruits, to a certain extent, also are being handled in this manner. Poultry and meats are often put up in handy units by the locker operator and sold directly to the consumer who may place them in his locker for future use. All this represents an interesting market for the new type of unit package.

Whether this food processing by the locker operator will be at the expense of the commercial quick-freezer or the canner, or whether it will merely conserve a great deal of food that might otherwise be wasted are points upon which no conclusion can be hazarded at this time.

A possible additional trend in the business was suggested at the Des Moines conference by Frank R. Wilson, Assistant Secretary of Commerce, who predicted that large refrigerated warehouses will be established in principal cities to collect frozen foods in carload lots from outlying locker plants and distribute them to metropolitan consumers.

Prof. Slater Bull of the University of Illinois warned the locker-plant operators that after the war they will face considerable competition from the manufacturers of small home-unit freezers "which probably will be marketed for as low as \$200."

Prof. Harry Carlton of the University of Tennessee, one of the nation's outstanding authorities on locker-plant freezing, told the conference that careful attention should be paid to proper packaging to preserve moisture. He recommended the lacquered cellophane as being the best wrapping material now available.

"Even if you charged your patron a half cent per pound more," Prof. Carlton told the operators, "for giving his food the best possible protection, it amounts to only 75 cents for a 150-lb. hind-quarter of meat worth approximately \$35; preventing a 2 per cent dehydration loss would pay the bill."

Prof. Carlton warned that the closure, whether it be a fold or a heat seal, should be carefully made. Although generally crediting the package manufacturers for their recent developments, he declared that there was need for more careful

seaming on some of the cellophane bags. "It is true that there is only a small percentage of leakers," he said, "but a small leak may spoil a package of food. A small leak of unfrozen heavy sugar syrup will thoroughly mess up a locker."

"Do not confuse moistureproofness with moisture-vapor-proofness," Prof. Carlton warned. "They have no relation in the protection of frozen foods. In protecting the many types of food passing through the locker plant we use sheets for wrapping irregular pieces such as meat cuts and containers in which are packed smaller pieces of more or less uniform size, such as fruit and vegetables, or cut-up chickens. The same material for protective purposes is required in either package."

PACKAGING FOR LOCKERS

The best recent discussion of packaging as applied to locker plants is the paper read at the Des Moines meeting by A. W. Shaffer.* An abridged version of this paper is presented herewith:

It is said that the community refrigerated locker plant development has been the stepchild of the frozen-food industry, at least from the standpoint of the packaging and freezing of perishable food products in order to prevent drying out or desiccation.

In spite of the importance placed on the use of proper packaging materials by the industry, many locker plants are still using inadequate materials or lack the necessary information and experience to make proper use of the materials they already have.

These improper packaging practices in the locker industry may be due to many factors, among them the fact that it is a new industry that has expanded so rapidly within the past few years that insufficient time has been given to the packaging phase of the business.

Locker plants are usually small in comparison with the establishments of some of the large commercial packers of frozen foods, who have laboratory facilities for testing the various packaging materials. The locker plants are therefore at a disadvantage in evaluating the comparative merits of various packaging materials.

Proper packaging of course is only one link, but a vital one in the chain of precautions to be taken to assure quality results. The best package cannot offset poor processing or inadequate freezing, nor can packaging improve the basic quality of the product itself.

We should set as the ultimate goal the arrival at the consumer's table of frozen products, whether fruits, vegetables, meats, poultry or fish that will: (1) taste as good as the same products strictly fresh; (2) have the quality and appearance of prime fresh products.

The frozen food industry as a whole is facing fundamental changes in that the old style bulk containers and methods of freezing no longer answer all needs nor meet the growing demand for small consumer units.

Quite naturally, this new demand can only be met by unit packages which permit day-to-day consumption in small quantities. In the final analysis it represents the development of a new style of food distribution which will eventually compare with consumer units of canned goods in breadth and variety, but equalling fresh goods in flavor and quality.

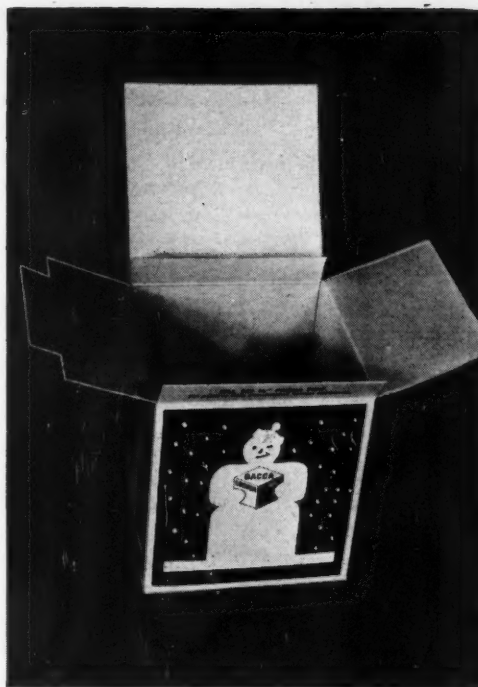
Some packaged goods industries have developed an overwhelming variety of container sizes and shapes that represent

* Technical Section, Cellophane Division, E. I. du Pont de Nemours & Co., Inc.

4—This bag-in-box package has illustrated directions for filling and sealing printed on the back panel. Cellophane bag may be closed either by tying or heat sealing.



5—The box-alone type has no cellophane liner, but is itself coated with a thermoplastic which makes it liquid-tight and allows heat sealing of the triple top flaps with an ordinary flat iron by the housewife. This box is shipped already set up.



fancied demands or subconscious desires to have something different. It has taken years of sales research and manufacturing studies to show that this often means exorbitant costs, unsatisfactory packages and situations where the packaging material has dominated the situation rather than basic requirements of the product itself.

Today there is no reason why a relatively new industry such as the refrigerated locker industry should repeat such mistakes. Basic fundamentals for frozen food package design are as follows:

1. Protection
2. Structural strength
3. Ease of handling
4. Trade satisfaction
5. Standardization
6. Cost

Each of the basic principles should be studied in connection with the needs of the individual locker plant.

Protection of the product from the time it is processed and frozen and until it reaches the consumer's table is paramount. Regardless of any other factor, if the food has deteriorated it will create resistance to future use. Therefore this factor cannot be overstressed.

Second, in the locker plant it is a mistake to use a package lacking in *structural strength*. While the locker package does not undergo the long distance shipment which commercial packages do, nevertheless, this is more than offset by the fact the locker package is not handled under as favorable conditions. So entirely aside from the package performing its chief function of preventing desiccation and protecting flavor, it should have sufficient strength to stand up under at least normal stacking and handling conditions. It should also be tough and strong enough to withstand normal and low temperatures.

Third, the wrapping materials and containers used in locker plants must necessarily be *easy to handle*. Trick packages must be shunned, for more often than not their best selling argument is based upon some novelty feature which has not been tried, tested and proven to be workable under practical operating conditions. Containers should possess the same

characteristics as wrapping materials in the matter of handling. They should be easily assembled, easy to fill and have an effective seal that is easy to manipulate.

Trade satisfaction is the next factor that cannot be overlooked by the successful locker operator. Packaging is a necessary part of marketing. Except for certain aspects in processing and in the volume handled, many of the packaging problems in a locker plant are significantly similar to the problems faced by the commercial packer. The end results are the same. The consumer or the locker patron passes trial judgment on the package. Each package must be designed to result in *consumer satisfaction*. All packages used for merchandising frozen foods must be attractive. Even for locker use, package appearance should not be neglected. While it is true that the locker container or package is not required to do the direct selling job of a retail store unit, a package that is attractive, clean and sanitary looking has an important psychological effect upon the consumer and cannot help but do its share in helping to perpetuate and expand the locker plant industry.

STANDARD CONTAINERS

Standardization of container sizes and packages is another requirement which cannot be too highly stressed as the effects are far reaching. Costs of most containers such as the "bag-in-box" type used for fruits and vegetables vary with volume purchased. Therefore it is evident that a wide range of sizes requires careful planning to avoid increased cost. Through the development of the quick frozen industry, certainly since 1930, there has been a trend from bulk to small packages. About that time the quick frozen fruits and vegetables industry was ready to develop the retail market which requires smaller packages than a 30- to 50-gal. or even a 5-gal. institutional container. The whole packaging period of that time may be described as a trial-and-error period.

In setting up sizes for frozen varieties of fruits and vegetables, first consideration is the purpose of the package and

second the size best suited for this purpose. The answer to these questions will determine the sizes of packages for various uses as well as standardization of them throughout the locker field. Packages based upon consumer preference will serve as a guide post in setting standards in most instances.

What about the *cost* of the package? Low costs with particular reference to packaging materials come through standardization, use of materials in most economical fashion, volume purchases and adequate inventories to avoid rush shipments.

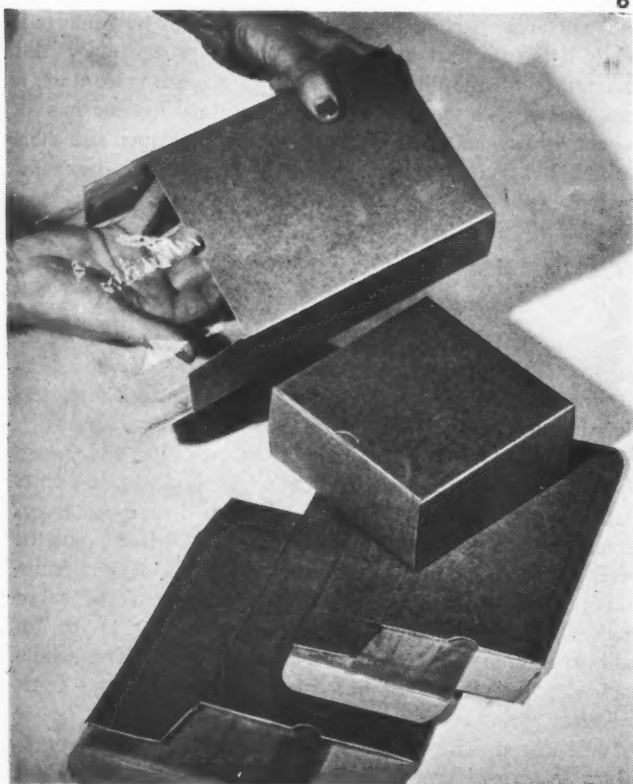
Cost of the package is important—extremely important—but only in relation to the other fundamentals previously mentioned, which are: protection, structural strength, ease in handling, trade satisfaction and standardization.

BASIC REQUIREMENTS

Before discussing packaging methods as they apply to locker plants, first take a look at what might be termed the fundamental requirements of proper packaging materials:

1. They must protect the food from desiccation and oxidation. Of the numerous factors considered in selecting a suitable packaging material, moisture-vapor-proofness should be considered first because this affects the quality of the product more directly than does any of the others. There should be no compromise on this point because loss in flavor, appearance and weight means that the basic reason for freezing in the first place is voided.
2. It is important that packaging materials be of a type that will protect the food from absorbing outside flavors, odors and contamination.

6—Inexpensive plain carton, sold in units of 100, has separate cellophane bag, easily inserted by the user. This package is manufactured in three sizes. 7—Example of bag-alone container is this bag of paper laminated with cellophane, which is simply sealed with a flat iron on kitchen table top, as illustrated.



3. It is also important that the material does not crack or become brittle at low temperatures; absorb blood, water, oil or grease, nor impart any flavor or odor to the enclosed product.
4. With fruits and vegetables where the "bag-in-carton" type is most widely used, it is important that the package be leakproof, stainproof, easy to fill and have an effective seal.
5. The requirements for the proper packaging of meats and poultry are equally as important as those for fruits and vegetables. The loss of moisture from the surface of the meat or poultry, or contact with air permits oxidation and development of rancidity of the fat. Wrapping materials must not only be moisture-vaporproof, but should also be moisture-resisting to insure stripping quality. By stripping quality is meant the ability of the wrapper to be removed from the meat while still in a frozen condition without undue sticking or tearing which results from absorption of liquids and subsequent freezing.

A wrapper possessing these qualities will also protect the original weight of the product wrapped and thereby reduce to a minimum or eliminate entirely the shrinkage losses due to evaporation or transfer of moisture or juices from the meat into the wrapper itself.

Much can be said on packaging methods. A wide variance exists in the methods used in wrapping meats, and in filling and sealing containers holding syrup fruits and vegetables.

Some distinction must be made in the methods and handling problems in a locker plant which may require the handling of a relatively few packages per day compared with the large commercial packer who handles thousands of packages requiring a straight-line production set-up.

The question has often been asked of the commercial



packer and it may well apply to the frozen food locker field. "What is the ideal package for frozen foods?" This is a question difficult for anyone to answer because of the variance in size, shape and nature of the products to be packaged. An ideal package for frozen vegetables such as cut corn, lima beans or peas would not necessarily be satisfactory for frozen steaks. Likewise the steak package would be unsuited for frozen peaches or cauliflower.

MOISTURE PROTECTION

However, there are certain qualities which all finished packages of frozen foods must possess, of which the most important is maximum resistance to moisture-vapor penetration, inwardly or outwardly. No matter how good the packaging material may be in resisting the passage of moisture-vapor, no package is better than its closure. This point cannot be over-emphasized. It is equally true in the wrapping of meats and poultry as it is with containers for holding fruits and vegetables.

Because of this, there has been a decided trend in recent years for food locker plants to adopt something that has been standard practice in the commercial frozen food field for years. It is the use of what is commonly referred to as the bag-in-box type of container for fruits and vegetables. This type of package may take the form of a separate bag and carton or a prefabricated bag liner attached to the inside walls of the carton and used as a single unit.

Protection in this type of package is not dependent upon the carton itself or the way in which it is sealed, but rather upon the use of a separate independently sealed moistureproof cellophane bag liner of the heat-seal type in combination with a carton to produce the desired protective results and to meet requirements in handling, compactness and structural strength.

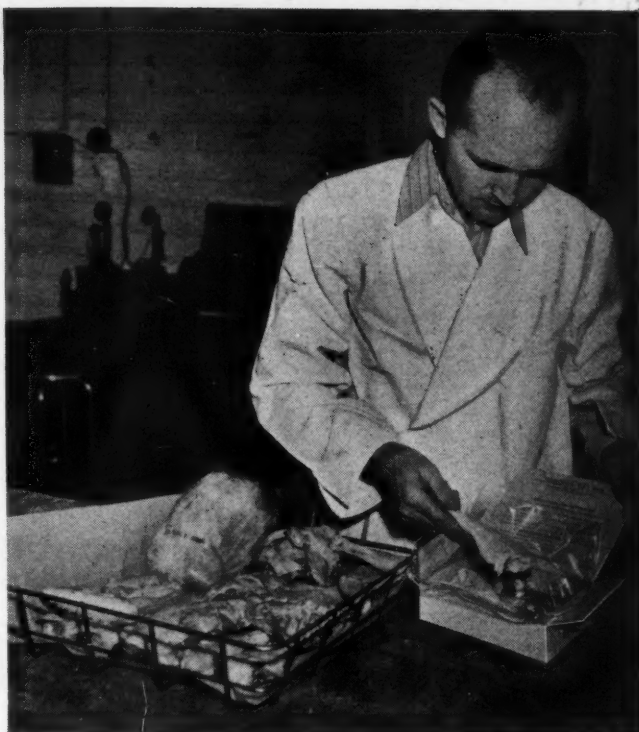
In connection with the use of cellophane in the frozen food industry, the use of the moisture-proof type is assumed and not the type of film known to the trade as "plain transparent" cellophane. This is not recommended for frozen foods because it does not afford moisture-vaporproof protection.

The paperboard container enclosing the cellophane bag lining is fashioned from selected material, free from odor, and paraffin coated to resist moisture or water penetration.

Suitable containers made of paperboard may be divided into two classes, depending upon their shape. Each class has its good and bad points. One class of paper containers includes cups, tubes and circular-shaped straight-wall side spiral-wound containers commonly classified as the round type. The other includes square-cornered cartons available in almost any size or shape. For locker plant use the most acceptable has been the rectangular shape in the 1- and 2-lb. sizes.

The rectangular and spiral-wound cylindrical-shaped containers are available with moistureproof cellophane bag liners which can be heat sealed to make them moisture-vaportight as well as liquidtight.

A note of caution should be sounded in connection with the handling of the bag-in-box type of package. It is not sound practice to insert flat bags in cartons, then fill and trust to luck that the weight of the product will properly round out the corners of the bag. Unless the bag is preformed over a mandrel, it will not usually shape itself properly to the walls of the carton. Improper shaping causes excessive wrinkling



PHOTOS, COURTESY DU PONT CO.

8—Cut chicken, too, is efficiently packaged in the new moisture-vaporproof container with heat-sealing cellophane. Locker operators now use this better packaging.

and pinching of the cellophane, and the chance for pin-holing or cracking.

In filling the bag every effort should be made to keep the mouth or upper rim as clean as possible. The top portion of the bag is where the heat seal is made and it is obvious this surface must be kept free of product to insure a proper seal.

After the container has been filled, the part of the bag extending beyond the upper rim of the carton should be carefully flattened and pressed together to remove as much air as possible within the package and thereby prevent oxidation. The next step is the final sealing of the bag to prevent liquid leakage or air penetration.

The sealing iron should be at the proper temperature. Bags made of moistureproof heat-sealing cellophane for frozen fruits and vegetables may be best sealed with a temperature of about 255 deg. to 265 deg. F. and pressure applied for upwards of a second or so. Care must be exercised to prevent the iron from becoming too hot. Too much heat will burn the cellophane and cause it to become brittle, so that it may crack when subjected to freezing temperatures. Too low a temperature will result in weak seals.

Just as fruits and vegetables are more adequately protected from desiccation and oxidation by the use of a sealed container of the types represented by these samples, so meats and poultry retain their full flavor and appearance, and suffer no loss due to desiccation when the same procedure is followed in securing a moisture-vaportight sealed package.

The packaging problem for meats in locker plants is undergoing constant study and much experience has been gained in developing sounder and better methods of wrapping—thanks in no small measure to the helpfulness and cooperation of locker operators.

"What is the best way to wrap a cut of meat?" is a question often asked. This can be answered best by analysis of the method used to apply the (Continued on page 154)



1—The Navy's new standardization of clothing containers permits quick and efficient modern equipment to get in its best work. Photo shows "fork truck" depositing top deck of palletized load in a railroad freight car.

Navy standards for palletized unit loads

Keeping Naval Forces well-clad is a colossal task. It requires the handling of 1,000 truckloads and carloads a week and more than a million garments a day. These are not merely the blue undress, blue dress, whites and dungarees of peacetime, but hundreds of different items for sea and land, for arctics and tropics, for jungle, for camouflage.

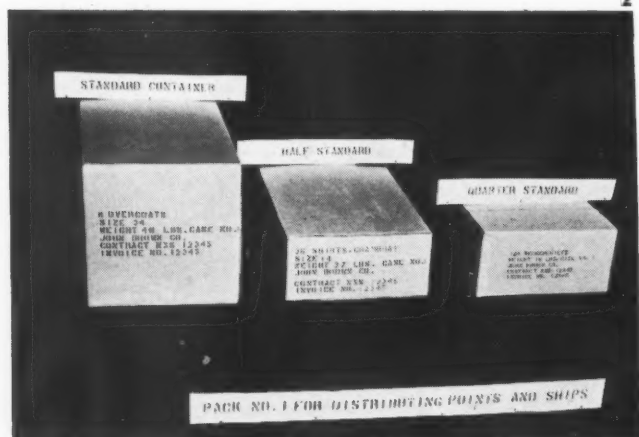
The heart of the huge circulatory system which keeps these garments moving is the U. S. Naval Clothing Depot in Brooklyn, housed in two 8-story buildings, two blocks long and one block wide. A walk of approximately $7\frac{1}{2}$ miles is required to inspect the plant, which is not only one of the largest clothing manufactories in the world, but a reception center for the thousands of garments received daily from contractors.

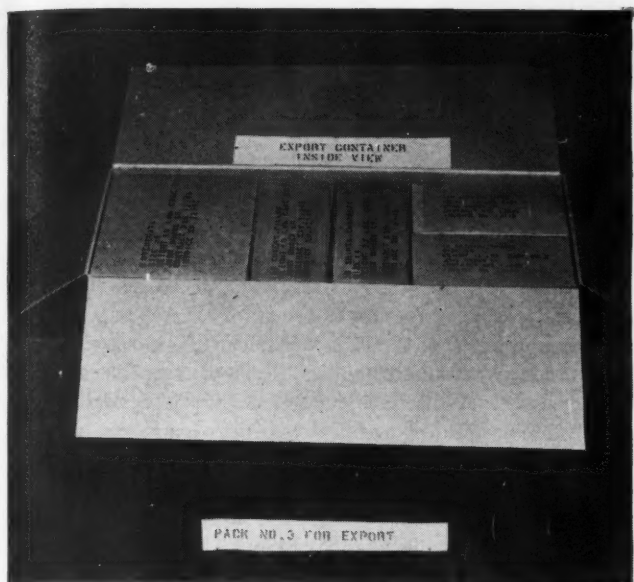
Plans for handling this packaging procedure were inaugurated under the direction of Capt. Charles D. Kirk, S.C., U.S.N., Supply Officer in Command of the Naval Clothing Depot. This plan entailed the standardization and simplification of all packing and packaging procedures to save man-hours and materials, notably sulfate fibre. Though designed for the Naval Clothing Depot, this plan has applications in many branches of industry. Many boxmakers and

clothing manufacturers supplying the Navy are already becoming acquainted with these applications. There is a good chance that a fair share of the features of the system will be carried over into the nation's industry in peacetime.

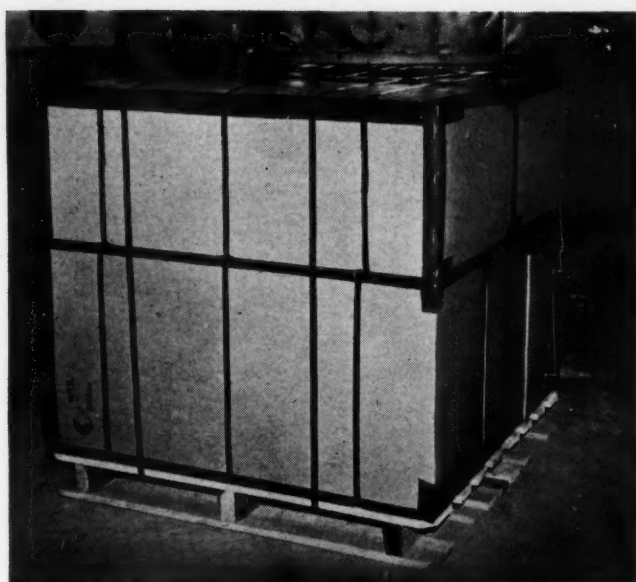
Before setting up its new plan, members of the depot studied thousands of containers already in use. It was finally decided to reverse the old policy by "standardizing the boxes, letting the issues fall where they may." A big part of the problem of handling the enormous quantities of clothing passing through the depot involved transportation to move it through the great distance within the building, into and out of elevators, and on the shipping floor. First step in reform was the adoption of what is called the "palletized" method of transporting packaged items. For this, standardized pallets, taking loads in units of 4 ft. by 4 ft. were selected. These pallets differ from the skids formerly used in that they have three runners instead of two and a bottom as well as a top deck. This construction requires the use of a fork truck to lift it. The forks on the small motorized trucks may be moved up and down so that the palletized units may be deposited wherever desired in double-decker fashion.

2—Three pack sizes for standard 4 ft. by 4 ft. pallet loads. They are designated as standard, half-standard and quarter standard. 3—The pallet accommodates 18 standards, 36 half-standards or 72 quarter-standards.





4



5

4—Export cartons are fitted over domestic standard cartons and can accomodate three standards, 6 half-standards, 12 quarter-standards or combinations of these. 5—Waterproof tape is applied to seams and to all flaps and openings. Treated this way, these export containers were dry after nine hours under running water.

Having settled upon the use of the 4 ft. by 4 ft. pallets, the depot standardized its packs in three divisions as follows:

Pack No. 1—Equivalent to a "retail" pack, this is comprised of three sizes of containers, called the standard, half-standard and quarter-standard. The accompanying photograph shows the three sizes. A pallet accommodates 18 standards, 36 half-standards or 72 quarter-standards, or combinations. Pack No. 1 is used for supplying distribution points and ships. Its units are purposely kept small to save space on ships and to prevent wear and tear on garments which might not be needed.

Pack No. 2—Equivalent to a "wholesale" pack, this is the Bulk Pack, used for shipments sent to training stations. It is standardized in units of four to the pallet.

Pack No. 3—The Export Pack. This is an outer carton into which the units of Pack 1 are placed. The outer carton of waterproof board is sealed with waterproof adhesive; waterproof tape is applied to all seams and joints, and each pallet is bound girthwise with steel straps. Standardized, five cartons to a pallet.

In the palletized system, the pallet cover fits on the top and holds the top layer of cartons in place. The cartons by the force of their weight hold the other layers in place for ordinary storage around the depot. Before shipping, however, each palletized load is bound together with $\frac{3}{4}$ in. by .020 curved-edge steel strapping.

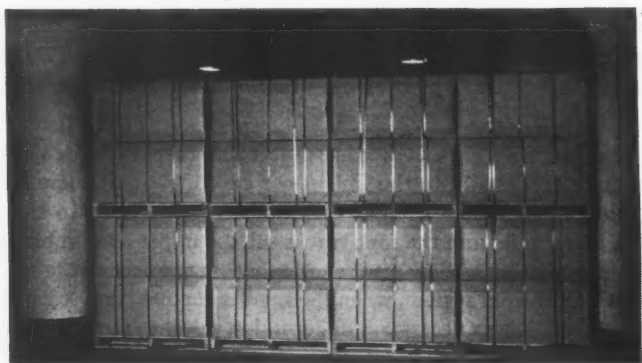
The economy of the new method is apparent in the time saved in gathering up the cartons and delivering them to the shipping floor. Formerly, transveyors, or "jiggers," as the small hand-trucks are called, were used to gather up the cartons and take them to elevators into which the loads had to be transferred by hand. There was another similar hand operation necessary to get the cartons out of the elevators and onto other trucks. Finally, there was the task of loading—still by hand—into freight cars. This procedure, which required the equivalent of the work of 14 men for a half-day is now accomplished by one worker in less than two hours. The saving is made because the fork truck mechanically picks up the entire palletized load at one time and drives it into the elevator, dropping it there. A similar hand-truck picks up

the load when the elevator has descended, takes it to the shipping floor, finally to the freight car and deposits it there for its final journey. Freight cars can accommodate two tiers of these units and the fork trucks set the upper load in place just as readily as they set the lower one on the floor of the car. (Under the old system, when the smaller cartons were stacked by hand, it was necessary, under union rules, to hire a helper for each worker who stacked cartons above shoulder level.) The average freight car accommodates 40 of these new palletized units.

The savings in cardboard, kraft paper, paper tape, metal-stitching and steel strapping under the new system are especially noteworthy. For example, ten "Hats, White," to use the Navy designation, were formerly placed in a box of 200-lb. test corrugated board and each set of four such boxes was placed in a master carton. These, in turn, were placed in bulk containers. The object of this careful packing was to keep the hats shaped as blocked. This care was entirely wasted, because nine sailors out of ten prefer to shape their white hats to suit themselves. Now the 200-lb. test boxes, the master cartons and the bulk containers have all been eliminated. Instead, the half-standard boxes of Pack 1 are used. Sixty hats are tiered and compressed together and placed in each box. These boxes are smaller than the ones which formerly held only 40 hats. A pallet load consists of 2,160 hats. The accompanying photographs show the materials saved under the new system.

Formerly, in shipping overcoats, each was placed in an individual corrugated box and each set of three such boxes was placed in a master container. Now the corrugated box has been replaced by a 50-lb. basis weight kraft paper bag and eight overcoats fit into the same size of box that formerly held three.

The elimination of individual packaging for large garments has resulted in substantial economies. In the elimination of thousands of boxes alone, at a minimum cost of 5¢ apiece, the saving runs into large sums. Wherever feasible, the kraft wrapping paper formerly used to enclose underwear, socks and other small items, in units of a dozen, has been eliminated and with it the gummed paper which sealed the assortments,



now a group of such items is simply tied together with string.

Large savings have been effected in the handling of bolts of cloth. Formerly each bolt was wrapped with two layers of reinforced asphalt laminated duplex paper (for waterproofing) and two wrappers of 75-lb. basis weight, heavy-duty kraft paper. The waterproof paper was a needless frill, the Navy said, because the cloth goes through a sponging process before it is made up into garments. So both of the waterproof paper wrappings were eliminated and a 60-lb. kraft was substituted for the 75-lb. wrapping. (Care is taken to salvage the 60-lb. paper for re-use or for sales to paper mills.)

The elimination of the full overlap slotting in standard and half-standard containers has also been a worthwhile conservation measure. While this type of closure is desirable, it is said to be wasteful of material and man-hours in a carton's manufacture. Instead, the box is slotted with inside flaps meeting and the outer ones overlap with no cutting required.

More than 30 carloads of fibre are saved every six months, as well as a considerable quantity of metal for stitching through a change in the bulk container. Formerly the entire body and the covers were made of 500-lb. test, double-wall, corrugated board which required stitching at the closure. A new type of cover was designed of 350-lb. test, single-wall board, which folds together without stitching.

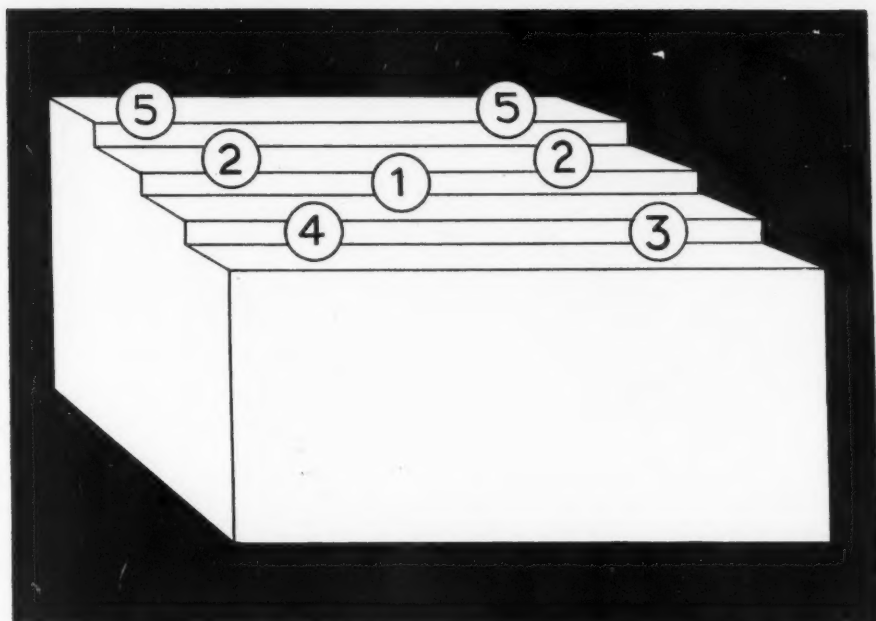
One of the greatest economies effected involves the Export Pack. Before the new system was devised, it was assumed that any carton might be exported. Therefore, every item that passed through the department was packed to withstand the hazards of export. Now every item is packed for domestic shipment and those destined for export are later placed in larger export cartons of the type described as Pack 3 earlier in this article. Made of export V-Board, this unit holds three standards, six half-standards or 12 quarter-standards, or combinations of these Pack 1 cartons. Today, when an order is received for a given quantity of garments to be exported, they are taken in their original domestic cartons and dropped into the waterproofed export boxes. After the boxes are filled, they are closed and waterproof adhesive is applied on top to the areas of contact between the flaps. Then waterproof tape is applied to all seams, flaps and openings and manufacturers' joints. This waterproofs the box in accordance with tests lasting nine hours under running water. The final step is reinforcement by steel straps (the $\frac{3}{4}$ in. by .020-in. curved edge variety)—three girthwise encirclements to each box. Export containers are kept on their pallets even aboard ship.

The method of packing twill is interesting. It was formerly packed in heavy cases, 1,000 yards to the lot. Now 2,000 yards are piled on the lower half of a half-slotted carton resting on a pallet. Over this is telescoped a half overlap slotted carton, approximately 44 in. in depth. Then the top flaps are folded over and the whole load is strapped to the pallet. Though it weighs about 1,500 pounds, the load is handled automatically with the transporter and fork truck. These can be stowed away two-high, without dunnage.

It requires little imagination (*Continued on page 156*)

6—Bulk packs, equivalent to a "wholesale" pack, standardized in units of four to the pallet. Used for shipments to training stations. 7—Same bulk containers in storage. 8—Palletized unit load of hats in 36 half-standard containers. Sixty hats in one of these boxes takes less space than 40 occupied by old packing methods. 9—Containers and strapping saved by new methods of packing hats.

Diagram of average candy counter stand. Spot 1 is considered the best position. Spot 2, left and right of center, is considered average or favorable. Spots 3 and 4 are considered poor. Spot 5, left or right, is also considered poor, but can be greatly improved by use of displays along the back of rack.



SHELF POSITION TESTS to aid candy bar sales

A study to show the influence of shelf position, display advertising and suggestion selling on sales of a popular-priced candy bar was recently conducted by the Point of Purchase Advertising Institute.

The test, conducted in 50 outlets such as newsstands, cigar counters, subway, hotel and theater lobby stands, was made for a manufacturer who plans postwar expansion in lines he will package and brand for distributors.

POPAI has broken down total results for use by a number of manufacturers who plan to develop the test idea as a basis for sales training material in store merchandising work.

Results of the study indicate that sales from average-prominent position on the counter increase in direct proportion to the display cards used and sales clerk support given to the unit items.

The test item was a newly developed peanut candy bar priced at 10 cents. It was first displayed in a poor position, alone. In the second phase of the test, the merchandise was displayed in an average-prominent position. Next it was given average-prominent position, plus display material. Finally it was displayed in an average-prominent position and supported with display cards and suggestion selling by sales people.

On the first day of the test with the product in poor position, 11 units were sold. On the second day, with good position, 201 units were sold. On the third day, the total went to 859 units with the merchandise in average-prominent position and supported by display material. On the final day, also in average-prominent position, but supported with proper display and suggestion selling to all customers, the total sales jumped to 1,172 units.

Relative selling positions used for the study are shown on the accompanying diagram as follows:

Spot 1.—The best spot on a unit of the type shown. This spot was *not* used in the test because the Institute wanted only average-prominent or average-favorable position. (Consideration of the spot as most favorable is in this case the contention of the candy manufacturer for whom the study was made and is not based, as far as known, on other data.)

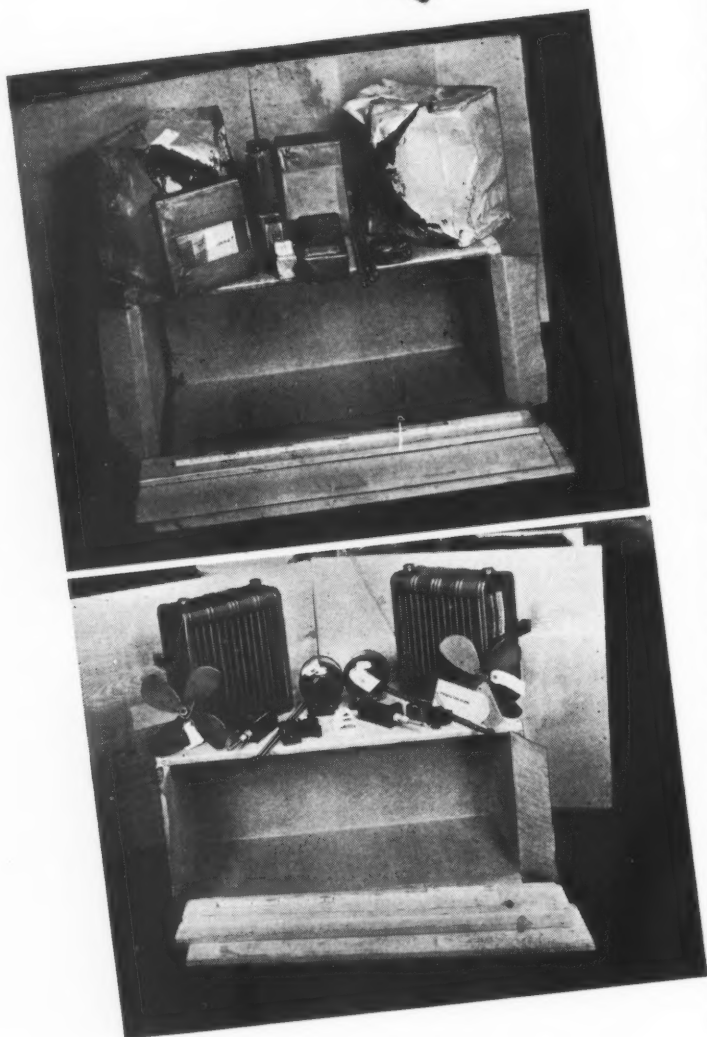
Spot 2.—Left and right of center were considered average or favorable positions in the test. If there is any difference in degree of value of the two positions, Spot 2 right (facing the customer) was considered the better.

Spot 3.—Considered poor position, but slightly better than Spot 4.

Spot 4.—Poor position, but not as good as Spot 3. These spots are low down on the unit and well to the edges. Both were used in the poor position test.

Spot 5.—Left and right of center were also considered poor—because of their location at top level and at the edges of the shelf. Spots 5 were greatly increased in value by the use of display cards along the back of the unit with the merchandise placed in front of the card, it was found. This position was also found good when merchandise was placed in this location in display containers tilted so that the merchandise showed.

The candy company with which POPAI worked out the tests expects to continue the study over larger samples and under varying conditions. Further detail will include study of sales messages used on the display cards and merchandising talks the clerks use in contact selling.



Design

Postwar perfume

Something is happening to the carriage trade and merchandisers of luxury lines are already beginning to gear for an expected greater transition in the postwar era. Four new American perfumes introduced last month by the House of Leigh, now a division of Shulton, Inc., are an indication of this trend. This company's perfumes used to sell in the \$7.50-an-ounce bracket. The new aromatic scents are offered at less than half that price, although equal in quality to those sold at the former price, the company states. This innovation, it is said, is in anticipation of a demand for American perfumes at an American price. Packaging of these new perfumes is streamlined to high-speed assembly-line handling. Each of the four scents—Poetic Dream, Risqué, Heartbeat and Dulcinea—are being put in the same kind of a bottle and the same kind of a box. Each, however, has a separate identifying tight wrap and label, inspired by the character of the various scents. An etched crest is the same on all glass bottle stoppers. The over-wrap is the same on every box, with suitable end labels for each scent.

Heaters for war zones

When American boys start crossing the Alps, there will be a neat package in the vanguard to help ease the cold. Waterproof, paperlined boxes will take Carrier Unit Heaters for shower and utility rooms up to the front. Packaged for export, according to Navy Department Bureau of Yards and Docks, each box contains two 46E-126 unit heaters, two aquastats, one thermostat, four 1-beam clamps and four hanger rods. Heaters are of a steam type and will provide for circulation of heated air.

To prevent corrosion and rust en route from Carrier's factory at Syracuse, N. Y., to any part of the world, each part (including motors and controls) is wrapped in a heavy, greaseproof paper. The paper keeps out rain, snow or salt water spray. The parts are then put into a wooden box, lined with waterproof paper and sealed to insure a tight covering and lining. In the accompanying illustrations may be seen the unit heaters and parts before and after they are wrapped, and the paper liner for the box. All parts fit securely in the box and are separated for protection by wooden partitions.

Histories

Bouillon cube packets

Bouillon cubes are an extremely hygroscopic product and therefore must be carefully protected to keep out moisture. Wyler's bouillon cubes formerly came in tin containers. Now five of these individually waxed paper wrapped cubes come in a heat-sealed cellophane tube which is placed in a tiny folding carton scarcely bigger than a five-cent package of chewing gum. The carton is a good example of how product identity, appetite appeal and informative data can be arranged over a few square inches of space. Product name is at the top, then an illustration of a steaming cup of broth, below which is a sales message: "Refresh yourself with a cup today." Colors are red, blue and yellow with a white background. The cubes are wrapped by means of hand-operated gauges over moving conveyors. The cellophane tubes are crimped and heat sealed.

Credit: Cellophane tubing, Humitube Co., Peoria, Ill., and Milprint, Inc., Milwaukee, Wis. Covers, Milprint, Inc., and Morris Paper Mills, Chicago. Cartons, American Coating Mills, Inc., Elkhart, Ind.

Bean business

More and more dry foods in cartons are being introduced for the civilian market by companies which in normal times are leaders in the packing of hot processed foods in tins. A great deal of ingenuity has been shown in developing items which can be packaged this way to present them with counter and appetite appeal.

Two new ones that appeared recently are College Inn Chili Dinner and Western Style Beans. Although these units contain nothing more than dried beans and spices, they have been dressed up to give the ration-harried housewife new ideas for preparing these nourishing everyday foods. A sombrero-ed Mexican beside a cactus plant is the pictorial suggestion for the Chili dinner, while a cowboy cooking over an open, outdoor fire is used as the illustration for the Western Style Beans. The reverse panels each depict a dish of the foods as they look when prepared. End panels contain the recipes and directions for adding the packets of spices inside the carton.

Credit: Carton, Container Corp. of America, Chicago.



Package versus bulk handling costs

by Ralph F. Breyer*

This topic has been the subject of an investigation just completed by the writer of this article with the help of several of his colleagues in the Department of Marketing, Wharton School of Finance and Commerce, University of Pennsylvania.

There is some information on the difference in the cost of certain grocery products to *household consumers* (consumer price) when in a package and when in bulk quantities that must be weighed or measured out to customers in the retail store. Certain grocery products are still distributed in *both* of these ways and where information concerning relative costs has not been collected this can be readily done. There are also available some statements of what this difference in cost to *household consumers* would be if certain food products now sold only in package would be marketed in bulk form. But there is some doubt whether such statements should be classified as information or misinformation. They usually aver that the consumer price for the same quantity of a given product if sold in bulk form would be substantially less than the consumer pays for the product in the package. How so? This question is not answered by "giving the figures," so to speak, but it is not difficult to see that the conclusion is generally reached somewhat as follows.

Assume that the consumer pays 10 cents a package for the product. From somewhere a figure of, say, $1\frac{1}{2}$ cents is gotten as the cost of packaging (even though accurate average packaging costs of individual grocery products for the entire trade, or any sizable section of it, are not to be had). From some other undisclosed source a figure of say $\frac{1}{2}$ cent per package for cost of advertising is gotten. If the product were sold in bulk, the argument runs, since there would be no package, both the costs of packaging and of advertising would be avoided. The same quantity and quality of the product in bulk form would be sold to consumers for only 8 cents instead of ten. Of course, nothing is said of the greater protection, convenience and sanitation afforded by the package that would be lost if the change to bulk handling were made or, if so, they are treated as inconsequential.

Marketing costs important

Packaging is assumed to be a marketing function rather than one of production although the contrary assumption would not alter the situation. It is true that the consumer price would follow downwards any significant lowering of marketing costs if competition were active all along the line from manufacturer to retailer which appears to be the case for the grocery trade taken as a whole. Hence the respective marketing costs of a product in bulk and in package form assume a vital importance from the public's point of view. They are also important to the trade, not only because of their effects upon the respective profits of the individual marketing concerns that are to be had from the "bulk distribution" and the "package distribution" of a given product but also as an approximate measure of what it costs the trade taken as a whole to give household consumers the extra services of the

package, a few of which were alluded to above, and to obtain for itself certain peculiar marketing services afforded by the package. This latter meaning will become clearer as the discussion proceeds.

In view of this two-fold importance of the respective distribution costs of a product in bulk and in packages it seemed desirable to explore the possibilities of establishing such differences in these costs as might exist to endeavor actually to compute the cost differences on one or two products in a comparatively small market area and to draw out in a particularized fashion the significance of such cost differences. To make such a small-scale exploratory cost study the Container Corp. of America gave a grant to the University of Pennsylvania. It was under this grant that the "pilot" study, so to speak, mentioned in the first sentence of this article was made and what follows is based upon portions of that study.

Rice one of test products

Instead of endeavoring to establish the total cost of marketing for bulk distribution and for package distribution of a given product, the study just referred to attempted merely to find what the difference in such costs are that are caused entirely or primarily by the disparities in the types of containers for each system, namely bulk and package.

Rice was one of the two food products covered by the study and since it will be used exclusively as the basis of further discussion, it can be employed here to illustrate the objective of the study. The study sought to determine how much more or less it cost to market (including the entire marketing process from producer through successive wholesale and retail stages to the consumer) cleaned rice to household consumers because it was distributed in one form (bulk) rather than in another (package). The distinction between these two forms lies in the nature of their respective container¹ patterns. For bulk distribution rice is placed in 100-lb. burlap or cotton bags at the mill and it remains in this container until it reaches the retail store where it is weighed out in small consumer quantities and placed in manila paper bags or in cellophane bags in a few instances. For package distribution the product may either be placed in the package, holding consumer quantities, at the mill or at some other point prior to the arrival of the rice in the store, more usually a wholesaler's or large chain's warehouse. In either case the packages are placed in fibreboard shipping containers in which they arrive at the store. Where the packaging is done at some point other than the mill, the rice is moved to this point in exactly the same 100-lb. bags as are used for bulk distribution.

Since the differences in costs of marketing were confined solely to those caused by the dissimilarities of these two container patterns, advertising costs, except for such advertising matter as was incorporated in the package, were eliminated from the cost calculations on the ground that such advertising is not caused by the use of the package although the latter

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If particular marketing channels are located, in each of which rice is handled both in bulk and package form and follows the same route of physical flow, then any cost differences that may occur as between the bulk handling and the package handling of rice in each such particular channel would come about by virtue of the existence of one or more of the following three circumstances: (1) an operation has to be performed or a financial burden must be carried for package handling and not for bulk handling; (2) an operation or financial burden is required for bulk handling but not for package handling; (3) the operation must be performed or the financial burden must be carried for both bulk and package handling, but because of differences in surrounding circumstances it costs more per pound of rice for the one than the other type of handling.

Such being the case particular channels (such as Mill A to Wholesaler B to Retailer C; Mill A to Wholesaler B to Retailer D; Mill A to Wholesaler E to Retailer F; and so on) each handling rice in both bulk and package form were first located. Then the entire length of the channel was examined to discover all operations² that might fall into any one of the three classes mentioned above (such operations being termed "cost-difference operations"). The costs of such operations were determined and this was charged against bulk handling or package handling as the case might be. The total of such charges against each type of handling for each particular channel was calculated and the difference in such totals, running against one or the other, was taken to be the difference in the cost of bulk and package handling of rice for that particular channel. Below is given a list of the specific operations that were commonly found to show cost differences when the packaging was done at a wholesale warehouse located in an eastern metropolitan area. Some of these, such as packaging and put-up, *always* evidence such cost differences, whereas others, like the difference in salvage price for used bags, sometimes do and sometimes do not.

1. At Processor Level:
(None)
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 - (a) Packaging, including weight losses.
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The study of cost differences for rice was confined to those occurring for the bulk and packaged rice sold in one large metropolitan area in the East. (*Continued on page 152*)

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The fact is that trail-blazing in research discloses much more than the original "quod erat demonstrandum." In this case, there was nothing whatever to serve as a guide. New patterns had to be found. The original plan included more than one product, but abnormal conditions made progress very slow and unforeseen circumstances made it possible to follow through to completion with only one product.

It can now be seen, as Dr. Breyer himself points out, that the investigation of this one product and the scope to which the research was limited has resulted in a fragmentary study which obviously leaves many questions unanswered. That one remaining product, too, is one which doesn't call for mass production packaging methods, nor for that matter does it call imperatively for packaging at all! Consequently, as the researchers would be the first to admit, it was impossible in this study for packaging to demonstrate its real values.

Nevertheless, the study makes a plain case for packaging. As the reader will see, in five out of 11 cases the handling of packaged rice was less expensive than bulk handling and in a sixth case, it was "even-Stephen." It is obvious that a study equally scientific and of equal integrity could be conducted on products of a perishable character. Such a study would not need to be limited to the operations of wholesale houses who use only hand and semi-automatic methods, but would cover all the speedy modern low-cost mechanized methods used in up-to-date manufacturing plants, and could also include investigation of the "intangible elements" to which Dr. Breyer attaches much importance. Then indeed packaging would show its real value to every user of packaged goods.

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TWO NEW PAPER CLOSURES



1

New ways of doing things with wartime substitute materials continue to make their appearance in the packaging field. Two new types of paper closures for wide-mouth bottles—one of them said to be capable of a hermetic seal—have just been introduced.

The vacuum seal makes use of a tacky liner disc, heavily coated on the under side with an amorphous wax, which is applied first to the bottle top and held in place by a paper side ring while vacuumization takes place. The tacky liner holds the vacuum and the ring is removed after the bottle emerges from the vacuumizer. Then a paper disc of oversize dimension is placed over the liner and the ring is replaced, resting atop the disc. The whole assembly goes under a special capping machine which turns the edge of the disc down tightly around the thread of the bottle opening and seals it firmly by driving the side ring back into place.

This vacuum closure is the development of a Buffalo paper-box company which also has designed the special capper

for use with it and has evolved a quadruple filling and capping production line. Such a line is now being set up in the plant of the Griffin Grocery Co., Muskogee, Okla., which is already packing its "Griffin" and "Polar Bear" brands of coffee with the paper closure. It compares favorably in cost with other closures now available.

Griffin reports that the closure was thoroughly tested before being adopted and was found to give adequate vacuum protection to ground coffee. Manufacturers of the closure declare that it will withstand up to 20 in. vacuum without wrinkling; 28 in. has been held successfully but the badly wrinkled condition of the liners indicated that leaks might later develop, they say.

The liner disc is made of white paperboard. The side ring is cut from convolutely wound tubes of kraft, pressed to give it a slight shoulder at the top. The oversize top disc is of brown chipboard and is die stamped to give it a slight indentation in the diameter of the bottle top and a crimped

1—The disc-and-ring type paper closure is said to hold up to 20 in of vacuum and is being used to cap at least two brands of vacuum-packed coffee now on the market. Housewife opens the jar by prying off the ring with a knife. 2 and 3—Screw-type closure is being used for both coffee and cosmetics, with varying types of liners. It is said to make a tight closure, although not a hermetic seal. Both types of cap can be colored and decorated.



2



3

"pie crust" edge which facilitates folding over the thread of the bottle.

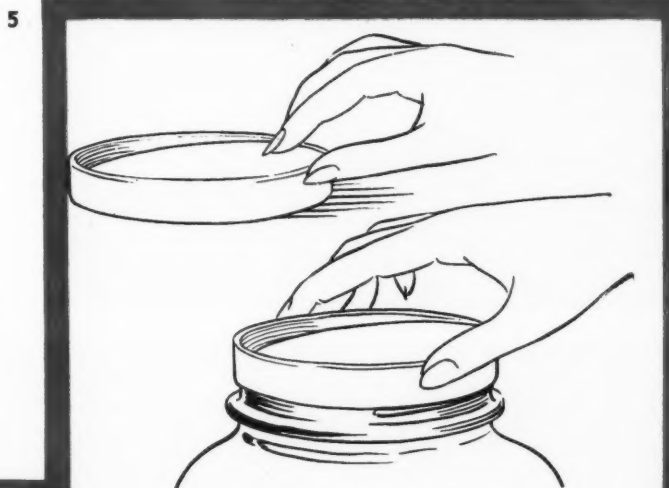
While the disc-and-ring cap will unscrew in ordinary usage, in the case of vacuumized products where the tacky liner is used the manufacturers recommend that the jar be opened by pulling off or prying up the ring. The disc and liner then can be easily removed. They can be replaced by reversing the process, a slight pressure of the hand replacing the ring.

Studies by the manufacturer of the closure indicate that one operator should be able to assemble 20 rings and liners and place them over the jars in one minute. Following vacuumization, the lifting of the rings from the jars, placing the disc and rings in a suitable press and pushing the ring over should be done at the speed of about 10 per minute per person. In the case of a non-vacuumized closure, a single filler is expected to operate at the speed of 15 containers per minute, while the quadruple filler should operate at a speed of 60 per minute.

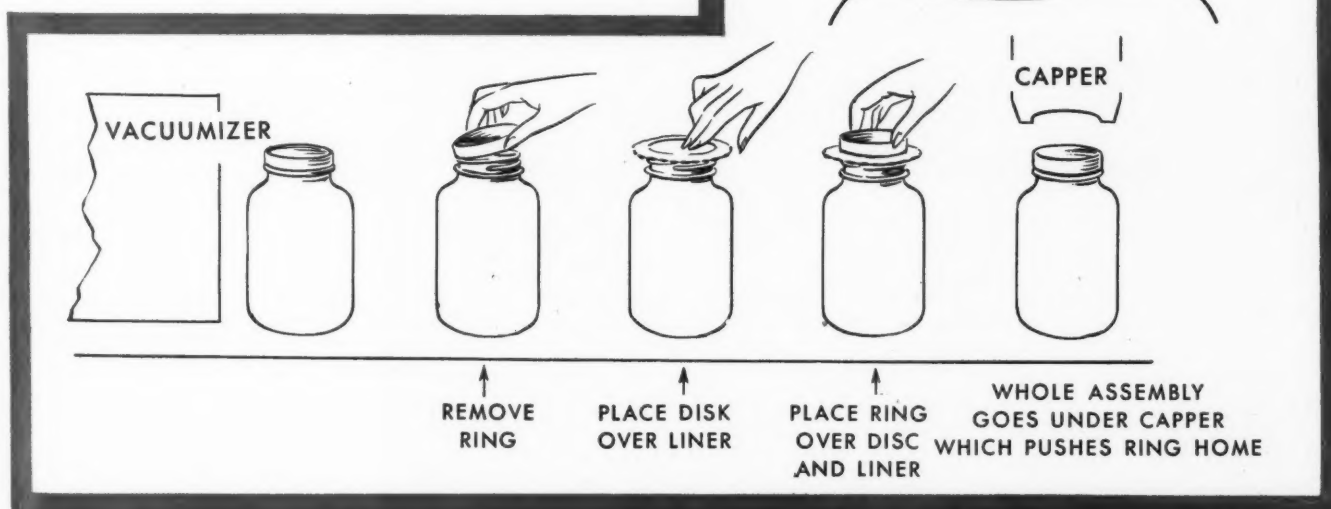
The second new paper closure is a screw-top type developed by one of the glass companies. It is already in use on wide-mouth jars in both the food and cosmetic fields.

These caps are being made by one of the subsidiaries of a glass company. They are being supplied in 53-, 58- and 63-mm. sizes, GCA Standard 400 finish, continuous thread. The material is sulphite manila fibre and the cap is supplied with two types of liners, although it is said that any standard liner can be used. For coffee jars, the manufacturer is supplying a combination pulp and oil liner called "Silite" and the cosmetic users have a vinylite liner.

The construction principles of the second cap are simple enough. A disc of sulphite manila is pressed into shape in the form of a cap and a heavy outer ferrule consisting of several thicknesses of moldable pulp is wound around it. This description is perhaps over-simplified, but this outer ferrule imparts such strength and rigidity as to keep the cap from



4—Special capping machine for disc-and-ring closure of the vacuum type. This principle can be adapted to either hand or pneumatic capper of conventional design. 5—Steps in vacuum sealing with the paper closure: Right, above, tacky liner is placed within ring, and ring and liner on top of the jar finish. Below, as jar comes out of vacuumizer, ring is removed, disc placed over liner, the ring replaced and driven home in the capper.



spreading while allowing sufficient torque to be applied to give a very strong and persistent seal.

All the parts of this closure are thoroughly impregnated with a specially processed wax and they are then formed in automatic presses, which were developed especially for the job in the plant of the manufacturer.

The manufacturer claims that the closure functions in actual production use exactly as does a metal or plastic closure; it can be applied either by hand or by automatic machine. Also it is said that the closure can be readily unscrewed by the user, and then—as in the case of coffee—reapplied quite tightly to protect the contents remaining in the container. The closure can be removed and replaced as many times as may be necessary.

Additional machinery for the manufacture of this closure is being installed and it is expected that capacity will soon reach 1,000,000 caps per day. Production so far has been unable to keep pace with demand. Material supply is also something of a problem, but if paper continues to be less critical than metal or plastics the substitute closure may find widespread adoption.

The users have not been stampeded by urgent need into accepting this cap without thorough test. One of the cos-

metic manufacturers informed MODERN PACKAGING that it had successfully withstood the most rigid tests for oil- and water-resistance, as well as most careful tests to determine the permanency and adequacy of the seal. They do not require a hermetic seal for their products. In the production line, they are handling these caps on fully automatic capping machines with the regulation hopper-feed.

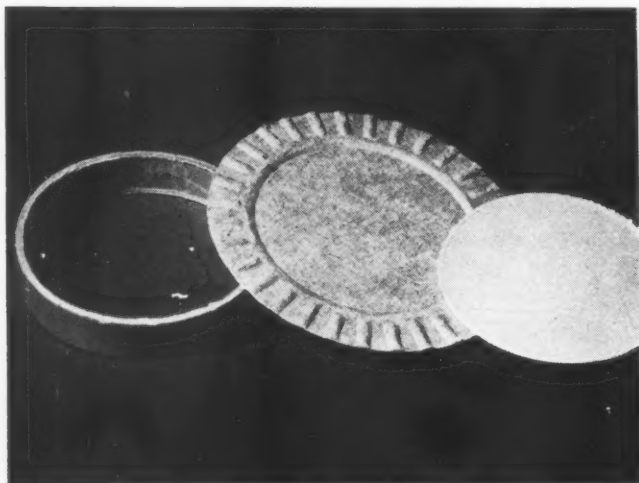
Eventually, these caps will appear as decorative members of a package ensemble. The material of which they are made and their method of fabrication both permit interesting color effects and printed reproduction of trademarks, etc. So far, however, because of the urgent need in the closure field, the manufacturers are confining their attention to production in natural color.

Coffee distributors are taking hold of the screw cap eagerly. It forms a tight enough seal, experiment has demonstrated, to retain the coffee aroma for a considerable length of time. Reid-Murdoch and Kroger have no hesitation in marketing their coffee in this package in ground form, while the A. & P. organization, sticking to their traditional practice, pack theirs in the bean only. The latter organization made no tests of this cap for gas- and air-tightness because of this fact. They are filling the jars mechanically and the caps are applied by hand.

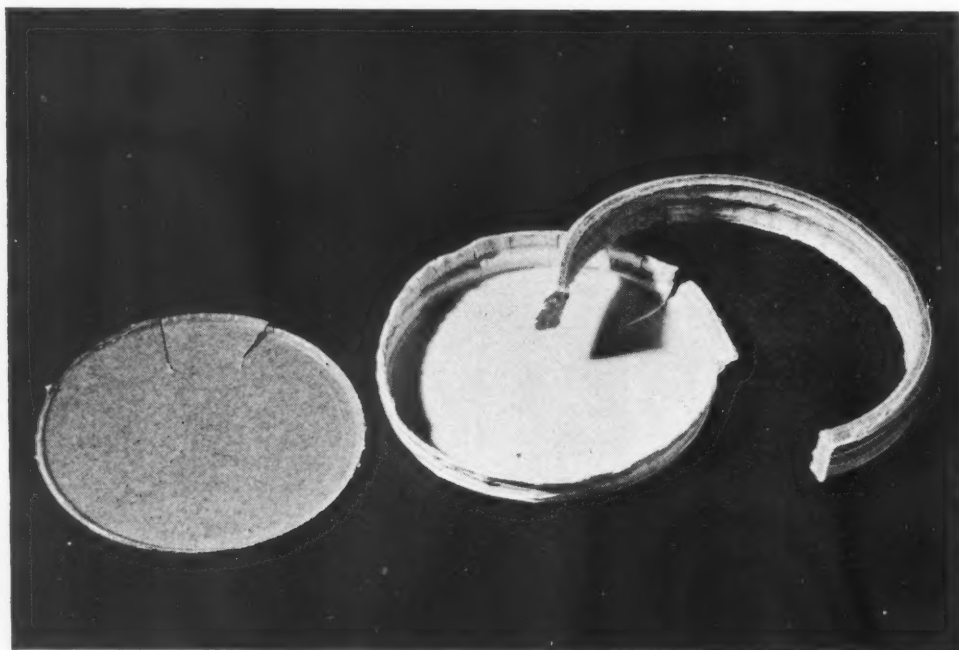
Some of the users feel that though the paper screw cap seems to be not quite as sturdy as the metal cap, their tests have demonstrated satisfactory results in respect to retaining its rigidity for periods which are more than equivalent of average shelf life. In cost, these caps are somewhat higher than the metal types which they have displaced, but the cosmetic houses report that they are less expensive than plastic caps. If later experience and volume production work out as expected, they are inclined to predict a permanent place for this cap.

The manufacturer states that improvements are constantly being made in both material and construction to comply with various conditions encountered in actual use with varying types of products.

Credit: Ring-and-disc vacuum closure by F. N. Burt Co., Inc., Buffalo, N. Y. Screw-top closure by Perma-Seal Closure Co., St. Paul, Minn.



6



7

6—These are the three component parts of the disc-and-ring closure. Smaller disc is heavily coated on one side with an amorphous wax which effects the vacuum seal. Larger disc with crimped edge is then laid on and driven down inside ring, as shown in Fig. 5. 7—Dissection of screw-type closure (Fig. 2), showing coated liner and outer ferrule of moldable pulp, cut to reveal their construction.



Pepsi-Cola goes to the fountains

1—Syrup is poured by hand from a 12-oz. bottle, while customer watches, into a glass bearing a syrup line indicating the exact amount of syrup to be used before ice and carbonated water are added.

Pepsi-Cola's fountain syrup, introduced since the Government restricted metal for crowns, is solving the metal cap problem to the tune of 5,000,000 crowns a month.

This saving was made through replacement of metal crowns by paper caps and plastic dispensers on bottles of fountain syrup. Translated into tonnage of metal available for war use, the monthly saving multiplied by 12 equals 210 tons a year or enough to build four heavy tanks of 50 tons each, according to Walter S. Mack, Jr., president.

Pepsi-Cola fountain syrup, which offers the company an enviable new sales outlet, is shipped in 12-oz. bottles similar in appearance to the familiar "big, big bottle" except for a color-applied label and paper cap. Use of the paper cap, similar to a milk bottle top, is possible since the syrup contains no carbonation and therefore does not have to be maintained under pressure like a carbonated beverage.

Fountain operators are supplied with plastic pouring de-

vices which replace the paper caps after the bottle is opened. This dispenser top also bears the Pepsi-Cola trademark.

This method of dispensing the beverage at fountains shows thoughtful planning in the use of available packaging materials at a time when material and labor shortages would have made it impossible to obtain other specially designed counter-dispenser units.

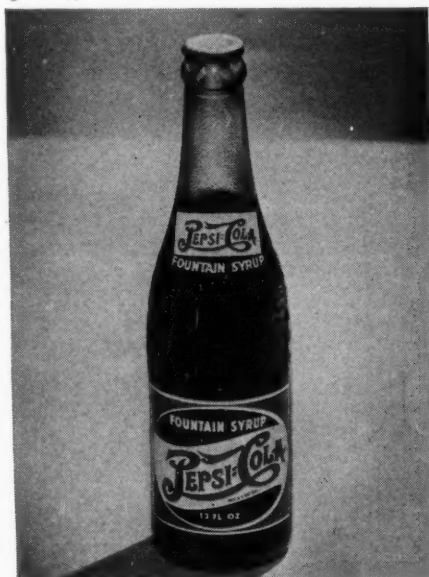
This fountain service provides sanitation and careful measuring of ingredients, and assures fountain customers of getting Pepsi-Cola when they ask for it, Mr. Mack pointed out.

The syrup is poured by hand (while the customer watches) from the bottle into a special 10-oz. Pepsi-Cola glass bearing a syrup line to indicate the exact amount of syrup to be used before ice and carbonated water are added.

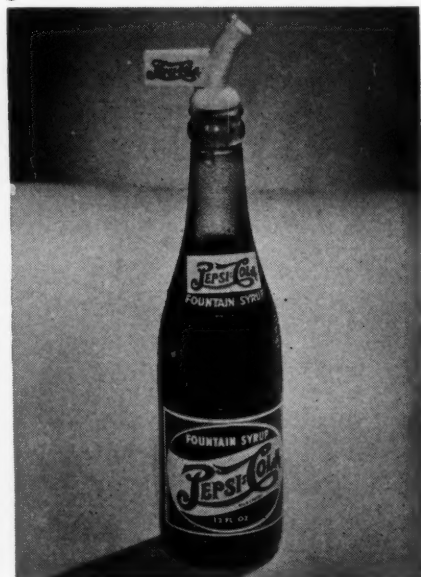
Credit: Paper caps, Smith-Lee Corp., Oneida, N. Y. Plastic dispensers, Advertising Novelty Co., Philadelphia.

2—Paper caps similar to those on milk bottles can be used on the syrup bottles to save metal since the syrup contains no carbonation and therefore does not have to be held under pressure. 3—Fountain operators are supplied with a colorful trademarked plastic pouring device for the syrup. This replaces paper cap after bottle is opened.

9



3



SEEDS AT WAR



by Millard C. Faught

1—Great bulk of seeds moves in sacks.

When it comes to wartime packaging problems, the people in the seed business are really in a class by themselves. Few things are fussier about the packages they travel in than are seeds. If seeds get too hot, too cold, too wet, too dry, too near strange odors, or take airplane rides too high up in the sky, they may die or at least lose their power to germinate and yield food for man. In total war, the yield of a few tiny seeds can mean the difference between victory or death through starvation to civilians and soldiers alike.

Military strategists well understand the "logistics" of seeds. One Commando transport plane can carry enough seeds to raise 10 trainloads of vegetables. To take advantage of this fact, Uncle Sam has sent to his allies overseas 62,000,000 lbs. of seeds of all kinds. He has kept his own soldiers in places like Australia and India well supplied too, because every ton of food that the Army or the allies can raise where they will eat it is one more ton of cargo space freed for guns and planes.

From March, 1941, to October, 1943, the United States had

sent, under lend lease, to the allies these vast quantities of vegetable seed: United Kingdom, 40,092,081 lbs.; Middle East, 11,405; Australia, 1,548,960; Govt. of India, 29,963; Southern Rhodesia, 28,000; British East Africa, 25,356; Equatorial Africa, 6,592; New Caledonia, 50,865; Malta, 3,000; Russia, 19,240,198; North Africa, 416,052. The total was 61,452,427.

Other millions of pounds have gone to our own armed forces and still more have been sent by private individuals in the United States to families in Britain and Russia so that they could raise true "Victory" gardens.

The combined results make one of the best chronicles of the entire war. Hitler thought he could devastate the rich Ukraine, starve the Russians and use the same soil to feed his own ravaging hordes. Now his villainous ambitions are a Nazi mockery. As fast, last spring, as the Russian soldiers could hurl the Nazis out off the black soil, American seeds were arriving to plant the liberated earth. Here is evidence from a letter received recently by our State Department:

PHOTO, FOOD DISTRIBUTION ADMINISTRATION

2

3



"As National Commissar for Agriculture in the name of the collective farming peasants of the Soviet Republic I desire to express my thanks to all American organizations and individuals who participated in the purchase, assembling and forwarding of vegetable seeds to Russia. After the withdrawal of the Germans from occupied regions, which they ruthlessly devastated and scorched, the help of American vegetable seeds assisted in re-establishing normal life to many destitute families.

BENEDICTOV, *Commissar for Agriculture.*"

Part of those thanks go to the men who overcame the packing and shipping problems which preceded delivery of the millions of pounds of life-saving seeds. American seedsmen were as thorough in their methods for insuring the quality and condition of their seeds as were certain Dutch seedsmen in subtly sabotaging seeds stolen from them by the Nazis. Wherever possible the Dutch seed merchants handled their seeds so they would be ruined in transit. We handled ours so all would arrive in good order in spite of a shortage of many normal types of overseas shipping containers like soldered tin inner cases.

Surprisingly, the great bulk of the war seeds which we have shipped have made their hazardous journey in trucks, Liberty ships, planes and even by burro or oxcart, packed only in single and double thickness cloth bags. The author has seen numerous cargo vessels loading in American ports with the entire holds filled with white seed sacks, packed together like roe in a fat fish. Fig. 1 shows a warehouse room filled with such sacks.

Under normal conditions transatlantic shipments of seed, being on a far smaller scale, are likely to be conducted with greater care. Shipment of most seeds in bags is adequate provided they do not become damp or wet any place in transit. In peacetime, when more time is likely to elapse before planting than is the case in the emergency of war, a much greater proportion of seeds is shipped in moistureproof containers such as lined boxes, drums and various types of cans.

Even under the material shortage exigencies of war, some 5,000,000 lbs. of seeds have been sent abroad in the past year in special containers. These were the non-lend-lease seeds

sent by the British and the Russian War Relief Societies in the United States to householders in Britain and the Soviet. Fig. 2 shows a typical "family carton." Each gift box contained a well-rounded selection of seeds adequate to supply a family with a year's supply of vegetables, mostly storageable biennials. For shipment the individual cartons were packed in strap-bound wooden boxes of the type shown in Fig. 3. The boxes are lined with oiled paper and are used to ship small bags as well as the cartons pictured in Fig. 2.

Figs. 4 and 5 show another type of seed container, fibre board drums which are used in sizes ranging from 1 to 60 gals. They have proved a very satisfactory substitute for tin containers where shipments must be protected from moisture and heavy treatment such as they would receive in going to a place like Equatorial Africa.

The drums pictured were made for the W. Atlee Burpee Seed Co. The shell itself is of waterproofed laminated seamless jute fibre. The ends are flanged wooden bulkheads with self-locking steel rims. They are light enough to meet the requirements of air express but at the same time sufficiently rugged to withstand "crash landings" or a mule's back.

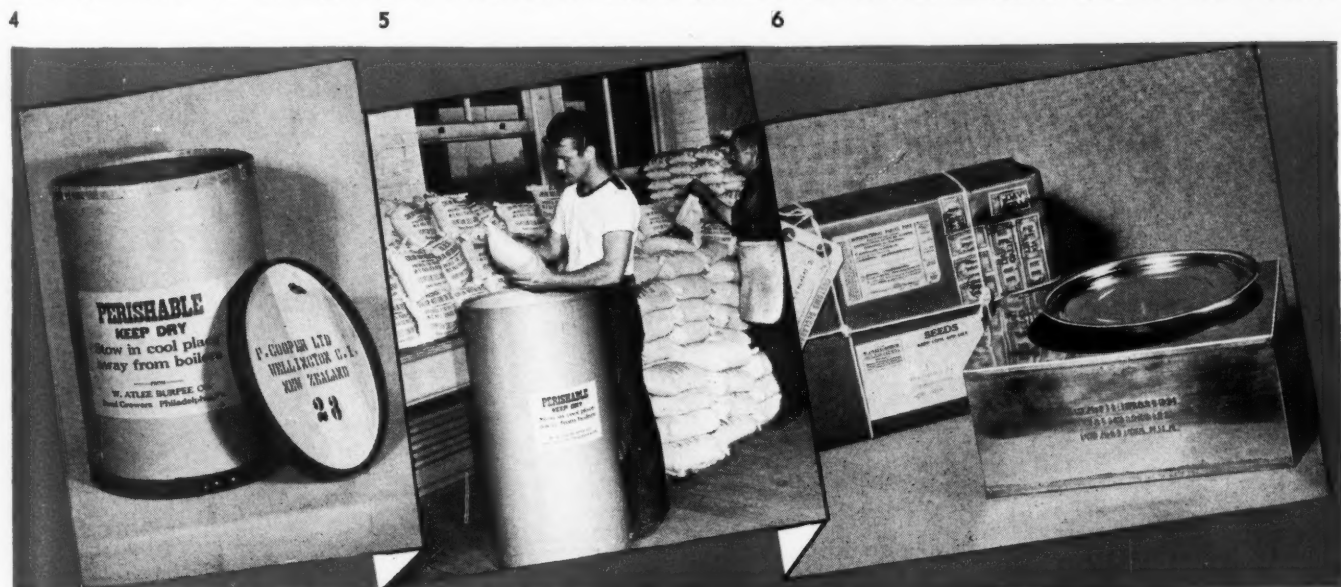
Fig. 6 shows a much scarcer prewar type of seed container, a tin cannister which can be soldered airtight after filling. These containers are designed to be moisture, disease, insect and rodent free. One drawback is that certain seeds may "sweat" inside over a period of time.

This war, in which seeds are playing such a strategic role, is virtually revolutionizing international traffic in seeds. Heretofore, the United States has been a heavy importer of seeds from the Low Countries, Germany, the Balkans, Russia and North Africa. Now the flow, on a vastly increased scale, is the other way, except to enemy and enemy occupied areas.

The consensus among seed shippers is that the container people are doing a fine job with the woefully limited materials now available, but that in the future, with thousands of kinds and varieties of seeds and bulbs to be sent abroad to every type of climate, a huge assortment of "tailor-made" containers will be needed.

Credit: Drums, Carpenter Container Corp., Brooklyn, N. Y. Cannister, American Can Co., New York, and others.

2—More than 5,000,000 lbs. of vegetable seeds have been sent as gifts from Americans to British and Russian families. 3—In wood boxes go "American seeds for British soil." 4 and 5—Water-resistant, seamless, jute-fibre drums have replaced metal containers. 6—Nothing short of a torpedo is likely to get into this soldered tin can of seeds for South Africa.





1 The illustrative theme in full color and old-fashioned lettering on this box for Americana Fruit Cake, adopted by Berke Cake Co., will carry the spirit of American Christmas tradition wherever it goes. It was planned principally as a gift item for men in service. The lid is constructed like a folding carton. The base is like that of a set-up box. Designed by Alan Berni, New York. Folding Carton by Eastern States Carton Division of Robert Gair Co., Inc., Brooklyn, N. Y.

2 Effectiveness of the seal is one of the important factors in the selection of a ceramic container. This problem has been solved by combination ceramic and cork closures on these graceful pink and blue containers for SRF day lotion and SRF night cream distributed by Sperti, Inc. The ceramic part of the lotion container cap is made with a stem. A pierced piece of cork is then placed over the stem and adhered to the ceramic piece. A cork disc is secured inside the cream jar cap so that when the closure is put on it fits the jar finish precisely. Design models by Rookwood Potteries, Cincinnati, Ohio. Ceramic containers and caps by Vanderlaan Tile Co., New York. Closures fabricated by Armstrong Cork Co., Lancaster, Pa.

3 Newcomer among the ranks of paperboard powder containers is this elongated, octagonal-shaped box for Yardley After-Shower powder. The only metal used is for the dispenser top, yet because of the shape there is a striking similarity to previously used metal containers. The wide front panel allows ample space for brand and product identification. Dispenser top and background are black. Design and lettering are in green white and gold. Container by Imperial Box Co., Brooklyn, N. Y.

4 Five-pound units of pea-soya soup mix, packed by the War Food Administration for lend-lease, are being put into sturdy, delta-seal kraft bags printed in two-color design. Instructions for preparation are printed in 15 languages. Each of these kraft bags is placed in a double MST cellophane bag and heat sealed. Nine 5-lb. units are sewn in a heavy cotton bag and this is put into a multiwall bag, sealed with cloth tape. Complete unit is designed for protection and cargo space saving. Maximum preservation is assured by a new gassing process. Bags by Bemis Bro. Bag Co., St. Louis, Mo. Tape by Industrial Tape Corp., New Brunswick, N. J. Gassing process, The Dow Chemical Co., Midland, Mich.



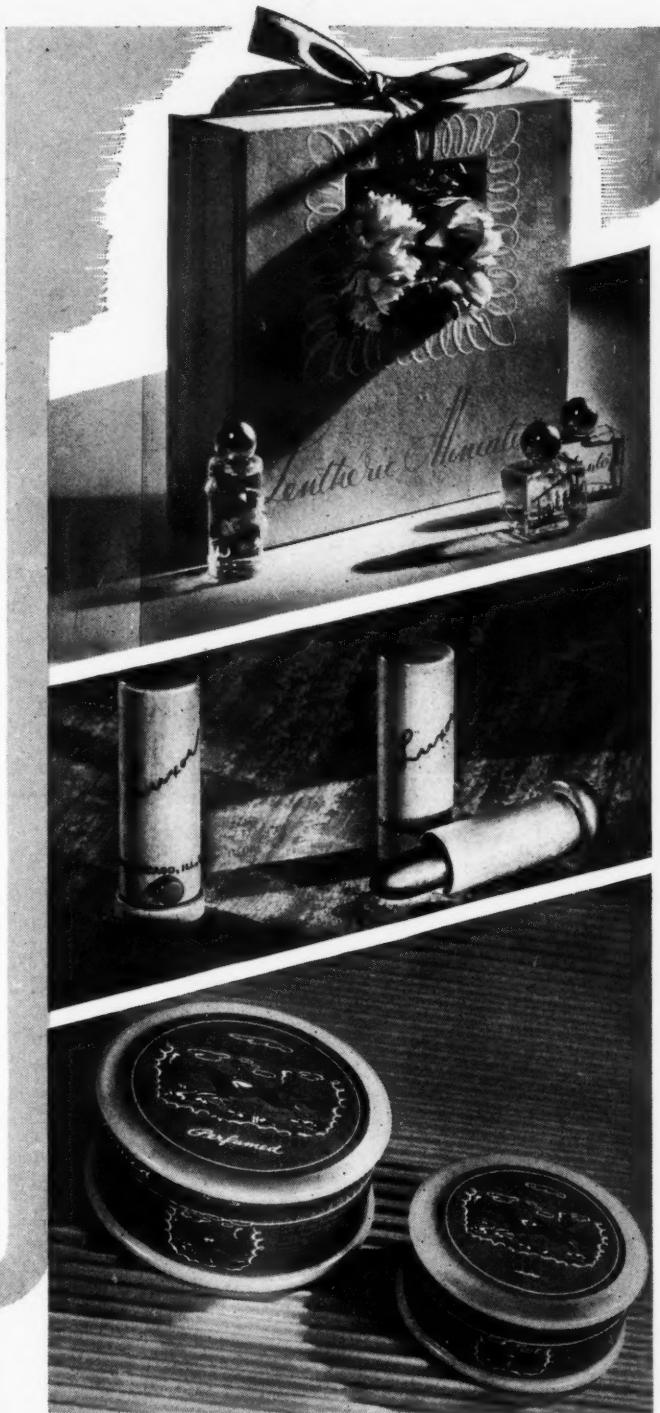
5 A super-duper in luxury re-use packaging is this musical cabinet box put out by Belsic Products containing a 6 Thorens stormproof cigarette lighter, a drawer of cigarettes and two decks of fine playing cards. The box plays a melody each time the lid is opened. It is made of fine polished walnut, set off by a graceful band of reptile leather. The unit sells for about fifty dollars plus tax.

6 A tiny shadow-box, displaying a boutonniere that can be detached and worn on lapel is the Christmas gift item Lenthieric featuring for three miniature bottles of its leading perfumes, "Tweed," "A Beintot" and "Confetti." The box is pale blue with a white scroll design around the frame for the nosegay. A ribbon holds the bouquet in place.

7 Today's wooden lipsticks are a far cry from the early ones introduced to take the place of metal. A new process of impregnating wood with a chemical which seals the wood pores against the absorption of additional moisture is claimed for this new wooden lipstick adopted by Luxor. Special machinery, previously used for applying the lettering and design on metal containers, has been converted for use on wooden containers finished in clear lacquer. Lipstick containers by Scovill Mfg. Co., Waterbury, Conn.

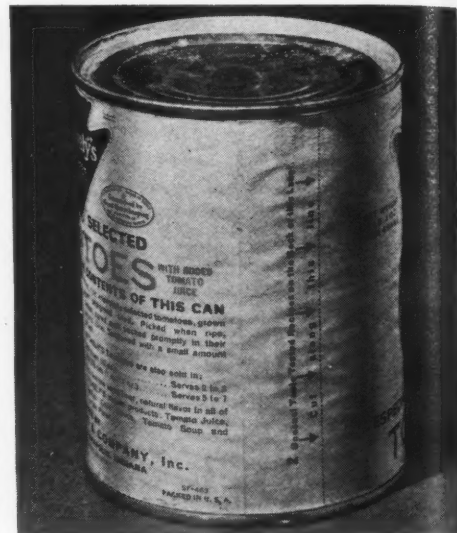
8 Similar to an old-fashioned patch box in which ladies used 7 to keep court plaster is this new opal glass jar-and-lid for "Hairid" and "Odorid," two toiletries distributed by the House of Wynchase, Merchandise Mart, Chicago. The two elements are held together by a band label and the lid is removed by running a knife blade around a line indicated on the band. The glass top saves metal and plastic. Labels are printed in rich brown tones with white for accent. The package has the counter appeal of a luxury cosmetic. Jars and lids by Hazel-Atlas Glass Co., Wheeling, W. Va. Labels by A. J. Andersen, Chicago.

9 What more appropriate than Derby's Merry-Go-Round box 8 octagonal construction, for a revolving tray containing bottles of five different sauces—barbecue, steak, Worcestershire, hot and chop suey. This unit put out by Glaser, Crandell Co., Chicago, is designed for department store and gift shop counter sales—a tempting item to pep up ration-planned meals.





1



2

1—New water-resistant labels—of high wet-strength paper varnished front and back—can be camouflaged by overprinting. 2—Label applied with water-resistant adhesive shown after 7 days' immersion in brine.

Must American labels be blacked out?

Canners who are merchandising-minded are disturbed by a recent Army camouflage move which would cloak in complete anonymity the brands of food products now pouring overseas. They feel that they should have the privilege of carrying their brand names to the millions of American troops abroad, and—more important—they know that the same Army cans are going to feed millions of civilians in scores of foreign lands where American brands will be bidding for business after the war.

The Army, of course, has a sound reason, or rather two reasons, for its action. It has found that the bright labels and bright tin ends of food cans attract enemy planes and gunfire to troop-concentration areas and it has found that ordinary cans may rust and contaminate the food when subjected to extreme conditions of exposure in the field. The Army's answer is direct and thorough: It has ruled labels off the cans and directed that the cans be completely covered with a drab-colored, wax-base, corrosion-resistant paint bearing only a single identifying word as "Peas," "Beans," etc. In 10 of the largest canneries the Army already has set up facilities for applying this label "blackout" and it is reported to be considering ways and means of extending the process to all canneries doing Army packing.

There can, of course, be no quarrel with the Army's purpose, which is to conceal military dispositions and protect the lives of our soldiers. That is a matter of military necessity. But packaging men have been asking themselves whether there is not some way to attain the Army's two aims while at the same time preserving brand identity.

The situation was the subject of considerable discussion both on and off the floor at last month's New York convention of the Packaging Institute. It should be a matter of interest to the entire packaging field that two companies, working cooperatively, have developed a promising solution.

The solution, which awaits acceptance by the Quartermaster Corps, involves a special new water-resistant label developed

by a leading lithographer and the new water- and corrosion-resistant aqueous adhesive with wide temperature range evolved by one of the adhesives manufacturers. Some details on the latter development were given at the Packaging Institute meeting.

The suggested procedure involves also the cooperation of can manufacturers in spraying the outer surfaces of can tops and bottoms with a non-reflecting dull lacquer. It involves finally the overprinting of the canner's regular color labels—made on high wet-strength paper—with a camouflage pattern scientifically designed to kill reflection values but leaving the basic label easily discernible on close examination. Samples of cans so camouflaged are shown in Fig. 1.

This procedure is simple; it requires no new machinery and will not appreciably delay production, its proponents say. The labels can be applied by a standard labeling machine or comparable results may be expected of hand-labeling operations by use of a comparable water-resistant lap paste. The hot melt pick-up resin is said, furthermore, to be suitable for spot labeling in automatic equipment capable of applying this type of material to No. 10 cans at both ends of the label. The new adhesive simply takes the place of the usual pick-up gum on the ordinary labeling machine. It gives a water-resistant seal and joint at the lap. The manufacturer of the label "spares" the varnish on the corresponding edges.

The process is inexpensive; its backers estimate that the complete job of water-resistant labeling can be done at an additional cost of only about 1½ cents per case of 24 No. 2 cans.

The Quartermaster Corps has long been searching for labels and adhesives which have greater resistance to exposure. There is the classic story of the barge loads of canned food which floated ashore on a Solomons island—after having been flung overboard during an emergency—completely naked of labels or any other means of identification of the contents. This situation has been corrected by improved

adhesives, but there has been evidence that some adhesives still commonly used, such as the more hygroscopic types of lap paste and cold pick-up gum, actually promote the corrosion of cans and the consequent contamination of contents under extreme conditions of exposure.

The adhesives firm which developed the new water-resistant formula conducted laboratory tests comparing standard can labels and adhesives with the new resistant label and adhesive. Its report asserts that both types of labeling were applied by a standard labeler in a New Jersey plant after which the cans were totally immersed in a brine solution at room temperature and then spun periodically. Within 3½ hours, it is said, the ordinary adhesives gave way at the lap seam and the ordinary labels themselves disintegrated to a considerable degree.

The water-resistant labels and adhesives, however, stood up for the entire seven days that the test was conducted, the report stated, and "it is reasonable to assume, from the condition of the samples, that they would withstand considerably longer immersion without appreciable change." On removal from the 5 per cent sodium chloride bath, the labels were somewhat wrinkled (Fig. 2), but when they had air-dried they showed only a slight ripple, which was not considered objectionable. The lack of "bellying" or expansion was attributed to the fact that the label stock is varnished on both sides; this method of varnishing also adds greatly to the wet strength of the paper, the report says.

The labels after seven days' immersion in the brine are said to have shown no commercial difference in adhesion from cans that were not immersed at all. There were some rust stains on the label attributed to corrosion of the tin plate in salt water, particularly around the beads of the cans.

The results indicate that it is entirely possible to do a waterproof can-labeling job on a commercial scale with existing machinery, the laboratory report concludes. With camouflaging of can ends and camouflage over-printing of colored labels, it would appear that (Continued on page 156)



3—Examples of national insignia approved by OWI for labels of all lend-lease shipments. 4—Typical labels found in the stores and commissaries of Borneo. Arrows point to American labels which show to poor advantage against those of Australian and Canadian food packers.





1—Evolution of Lederle design now adopted for more than 70 products. Left: early packages, hard to read and without the distinguishing Lederle oval trademark. Right: new packages with new typographic treatment and trade and product identity emphasized sharply.

New technique for readability of drug labels

How to include all the label data required by FDA in readable type and at the same time have a package with counter appeal and ready identification is one of the greatest tasks in designing a modern drug package for the consumer market.

The redesigned line recently introduced by Lederle Laboratories, Inc., now comprising more than 70 different products—and with more to appear soon in the new dress—is attracting wide interest in the drug field and medical profession.

Here is a new family of labels planned by one of the country's leading designers so that every word is readable by average eyesight without the aid of a magnifying glass and with colors and clearly identified trademark standardized throughout.

A brief history of the Lederle line is necessary to understand the progress that has been made by the introduction of these new packages.

When Lederle started putting out biologicals at the turn of the century, these products were packed in set-up boxes with wrap-around labels. Since they usually went from the company to the doctor's or druggist's refrigerator, there was little need for eye appeal so long as label information met legal requirements. This same label style with minor changes was gradually carried over into the company's pharmaceutical and vitamin line. However, counter and window displays, particularly for vitamin products, demanded an improvement

over the old Lederle label which had served so well for biologicals and "prescriptions only" preparations.

Plans were launched about a year ago for this new project. First consideration was given to a special technique worked out by the designer for getting perfect register of design and legibility of printing on all the labels.

News Gothic was selected as the best type for readability in small areas and Bodoni for the titles and subtitles.

Master drawings were made of every label and carton design. The proper size type that would reduce to the required size for the label was selected in each case. This had to be figured out in advance in correct proportion for the reduction. A principle was observed of never reducing below 4-point type on the smallest labels. However by careful scaling in advance, even on some of the small labels, type sizes after reduction were maintained at 5- and 6-point. Drawings with type included were reproduced by photo-engraving to the proper sizes. In this way, the company stated, there was no danger of deviation from carefully planned layouts in which every space and placement of pattern had been calculated.

The code word and laboratory numbers are in the same position on all the labels and cartons. Colors are standardized, but with special identifying colors to distinguish between their human products and veterinary products.

First products to appear in the new Lederle dress were members of the vitamin line—Vi-Magna, Vi-Alpha, Toco-

pherols, Vi-Delta Tablets and Clipsules, and the other B Complex groups. For these, the original yellow previously used was modified to buff for overall package color. All lettering is in royal blue on background panels of white. Distinguishing features are horizontal strips in buff and the oval trademark which says "Lederle" on everything. This selection of only two colors for the complete job represents a saving in printing cost, yet gives an identifying design that is different from that of competitors.

Folding cartons are used exclusively instead of set-up boxes previously housing these products. These have advantages, the company states, in that they are more economical for this purpose and easier to handle. They stack easily, take up less storage space when delivered flat, simplify inventory and are cheaper to print.

Bottles have also been changed. Round amber bottles have replaced Blake bottles for tablets, powders and capsules. Liquids are put into a modern oval bottle. The change from Blakes to rounds was made to provide more space for label area—so necessary these days to meet legal requirements in describing vitamin preparations. The new bottles also afford uniformity of shape for all bottled products. Gradations of size are quickly seen by the purchaser and there are no distracting indented panels to confuse him.

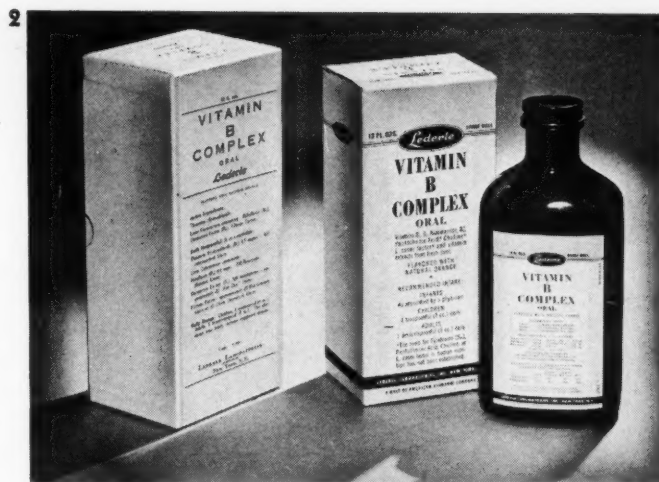
The company plans eventually to use all buff closures made of urea formaldehyde. For the duration, however, they will use what they have on hand or can get—brown or black plastic or metal.

The Lederle veterinarian line used to come in set-up boxes with red and white labels. Since no particular identification had been established, Lederle is going to use the same standard layout adopted for human products, with two shades of green as the identifying colors rather than buff and blue. Biologicals, too, are being given a new dress. Colors will be the same buff and blue as used for pharmaceutical products and a similar design will be used, except that the identifying stripes will be omitted to provide more area for copy.

A substantial percentage of Lederle products now go to the armed forces for which service Lederle was awarded the Army-Navy "E." Production facilities have been greatly increased, however, and practically all the company's products for prophylactic and therapeutic use are available for civilians in ample quantities.

All of the company's packages have been planned with restraint and dignity to symbolize the ethical character of the long-established Lederle name.

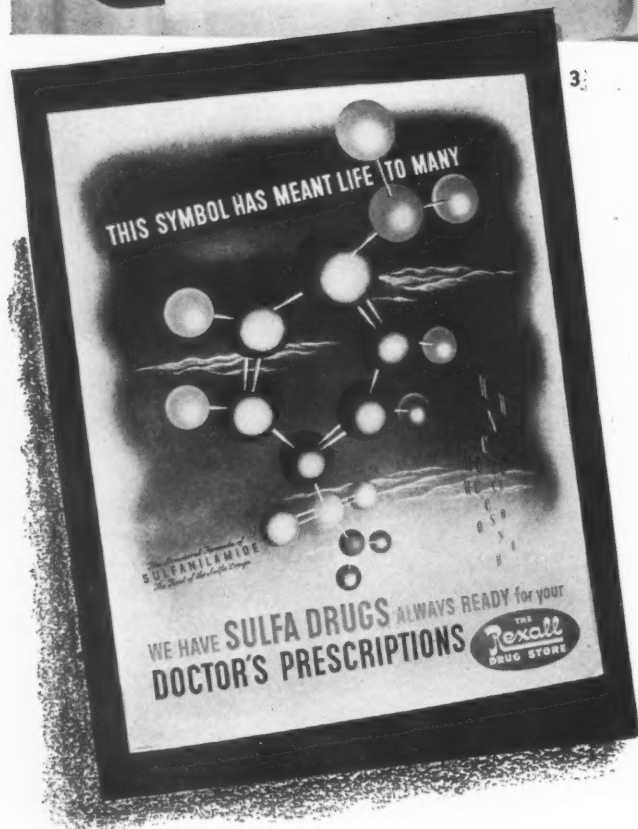
Lederle Laboratories, Inc., really began when Dr. Ernest J. Lederle, a young chemist, opened a testing laboratory in New York City. He attracted so much attention in medical circles that in 1902, when only 37, he became Health Commissioner of New York. A year later he set up the company which bears his name to make diphtheria antitoxin. This was the first company to refine and market this antitoxin. He introduced various cultures to ferment milk and make it digestible. A Russian named Metchnikoff discovered *Bacillus Bulgaricus* while working in the Pasteur Institute in Paris. Dr. Lederle brought this product (Continued on page 158)



2—Set-up boxes (left) are completely replaced by folding cartons. Modern oval bottles replace old-style bottles. 3—Round bottles replace Blake bottles for tablets, powders and capsules. 4—Round bottles (right) contain greater label area than old one since informative data can be arranged on side panels. 5—Note how well new family design shows up on new folding carton at right to replace set-up box.



DISPLAY Gallery



1 Mifflin Chemical Co.'s new display "capitalizes" on the company's slogan, "The National Rub Down." Appearing in drug stores throughout the country this season you may see this dramatic illustration of the National Capitol behind which is the giant hand of Uncle Sam holding a bottle of Mifflin's rubbing alcohol. The construction of the card is such that a three-dimensional effect is created when a bottle of the product is placed in the hand. The whole sales message is carried in five words—the company name and the slogan. The only other copy that appears on the display is the line under company name that describes contents. Display by Einson-Freeman Co., Inc., Long Island City, N. Y.

2 Today, when labor is short, the silent counter salesmen is more important than ever. This well-designed perfume tester, made entirely of non-critical materials, has been introduced for Leigh perfumes (see page 72). The walnut tray holds four crystal bottles with crested stoppers by which the customer may serve herself. Each of the bottles, identical in design to those in which the perfumes are sold, is filled with one of the company's four scents. The tester is sent to every dealer with an initial order. The rack is packed for shipment with four 2-oz. refill bottles and four separate glass funnels, all wrapped in cellulose wadding for protection. Tester measures 11 in. by 3 1/2 in. The only decoration on the polished walnut is the company name. Along with the tester, the dealer is provided with a brochure containing many suggestions for window displays and other selling aids.

3 Modern artists have caught public fancy with colorful abstractions of complex chemical symbols and formulae. Such illustrations are like adventures into the unknown beyond the average layman's imagination. Air-brush technique has been adopted widely for these revelations of chemical discoveries. Rexall Drug Stores selected this treatment for a display to announce that they have sulfa drugs ready at all times for doctor's prescriptions. The display is colorfully dramatic, yet has the restraint and dignity in keeping with the ethical character of the products. The display is in full color with blue predominating in the background for the upper part of the illustration. Background of the lower part is yellow with the words "Sulfa Drugs" standing out prominently in red. Made by U. S. Printing and Lithograph Co., Cincinnati, Ohio.

4 This cabinet of early American design is for counter use in promoting Shulton Early American Old Spice perfumes. It is sturdily built of heavy cardboard, 9½ by 4½ by 13¾ in. and contains three shelves. It has a glass front and slide back. Each shelf has 12 indentations to hold a dozen dram-size bottles of perfume. It is given to every dealer who places an order for three dozen dram-size bottles. The slide back makes it easy to dispense the perfume. The cabinet is decorated with floral sprays and the Old Spice Lady motif. Background is cream-colored like the company's packages.

5 This simple counter merchandiser has been designed for the convenient packages of Personna Blade Mail—the ready-to-mail folder that combines letter from home and ten razor blades, described in November MODERN PACKAGING. The compact unit is planned for impulse sales at strategic point-of-sale locations. The cabinet is a die-cut folding carton type and serves as shipping container as well. Colors are red, white and blue to supplement the design of the package. Each contains a dozen of the folders. Dealers are also supplied with two window posters and counter cards as additional promotional aids.

6 This three-color display is being used currently by Consolidated Hair Goods Co., Inc., to promote the sale of their FIJ-Oil for home use. The merchandiser is arranged for good use of copy space to tell the sales message and allows ample place to present actual cartons of the product in the foreground. These cartons fit into a die-cut base. Designed by Mason Studios and printed by Carl Gorr Printing Co., both Chicago.

7 Color tones that suggest the golden brown of fried chicken or a veal chop were selected for the counter unit to sell Modern Maid Redi-Breader, the ready mixed breading which saves the housewife milk, eggs and cooking fats. A die-cut opening allows a place for inserting an actual carton of the product in the display. Inside the carton the product is packed in an 8-oz. parchment moistureproof bag. Carton flap is die-cut so that it stays secure when shut. Cartons by Acme Folding Box Co. Display by Marvin Ellis Co., New York.



An engineer speaks for the future

by L. W. Kendrick*

Packaging equipment users have been giving much thought to what they would like to have after the war. Replacement needs have been growing, and enlarged sales and the prospect of new items point to considerable purchases of equipment. Also, increasing labor costs highlight the need for further mechanization, the supplanting of semi-automatic machines by automatic machines and the mechanizing of hand work.

Obviously, most users will welcome the time when machines are obtainable again and for a while will be glad to get the foremost prewar designs if nothing else is available. But the war interlude has been long enough for users to crystallize their desires for improvements. Cumulatively, observations of the various faults, small in themselves, have built up in users' minds the need for major design improvements.

The prewar years provided machines that would "run." The postwar wants are for machines that will operate consistently well. As these wants are analyzed, as users ask themselves what postwar equipment design should do, the following specifications become clear.

1.—*It should reduce the human element to a minimum.* To this end, feeding, setting and servicing should be made easy. This involves unscramblers, setting without the use of tools, using the glass involved as the gauge and built-in lubrication.

2.—*It should have a maximum output.* To this end, the design should be such that the maximum practicable operating speed is fully maintained without stoppages due to breakage or spillage. This involves designing to handle abnormally wide tolerances with improper positioning affecting only the package involved, rather than making a breakage of glass or machine the penalty for faulty material or positioning. It also involves avoidance of abrupt changes in motion and ease of cleaning up spills.

3.—*It should operate normally throughout its life.* To this end, also, the human element should be at a minimum in lubrication and other servicing, and such wear as affects the quality of the output should be automatically compensated or taken up.

4.—*It should be safe to operate.* All pinch or seizure points should be guarded with transparent guards if necessary so that a careless person will be protected as well as is now done with modern electrical installations.

5.—*It should look its best.* Appearance should be improved to give the feeling of competent design, if nothing more. Users are taking more interest in providing attractive working conditions for several cogent reasons and machine appearance is a large factor. Too many machines look as though they were just copies of a first experimental model and operators cannot develop pride in keeping them clean.

The human element, fallible and costly as it is, gives users major concern. Many strides have been taken by machine builders in reducing its impact, but many more are desired

In this challenging article a plant engineer sets up a postwar mark for machinery manufacturers to shoot at. Some of the things he demands may already be available—at a price or on sufficient priority—; others may be on the drawing boards; still others may not be practical beyond a certain degree. The article will command the interest of other machinery users as well as machinery makers.

so that fewer operators are needed on a line and any skills they may now require are transferred into the design of the equipment.

Feeding should be simplified by the further development of unscramblers, or other mechanical means, so that machines may be designed for greater line speeds. The present capacity of a feeding operator should not be accepted as a limiting factor. Fillers, cappers, labellers and cartoners should require no operator attention whatsoever during a run except for feeding the magazines occasionally.

Inspection and packing should be further mechanized. Except in the cases where bundlers are used, this station in a line is still essentially hand work. Corrugated carton sealers have progressed a long way on this road, but carton stacking on skids is still hand work, either at the sealer or at the end of a delivery conveyor. In many cases, at the present line speeds, the use of automatic sealers is not economical because of the necessary presence of a stacking operator with time available to hand glue the cartons. Though the output of several lines can be stacked by one operator, it becomes a back-breaking hand job.

Simplify set-up

Set-up should be greatly simplified so that unskilled operators can readily change sizes. The skilled set-up man of today should devote his skill to true maintenance of equipment. Machine designers have gone part way in this respect, but where hand-crank adjusting means are provided, in some cases a mechanic's wrench is necessary to unlock the setting. The use of such tools for set-up should be avoided. The need for judgment in set-up positioning should be designed out of the equipment. Gauge points should be provided so that the glass may be used as the gauge, or else easily demountable single-use heads, as on some present labellers, should be employed.

The chore of hand lubricating should be eliminated as far as possible and this should be done in the basic designing rather than by the addition of automatic lubricators. Where it cannot be eliminated, such lubrication should be from one or two readily accessible points. Oilless bearings, short motions hinged on flat springs and hydraulically operated motions are examples. The maintenance man should be a doctor, not a nurse-maid.

* Chief Engineer, The Carter's Ink Co.

Simplification should be sought for many reasons, not the least of which is accessibility in case repairs are needed. Further thought will show cases where a few parts will do the work of many and often this will make for accessibility.

False simplification should be avoided, such as elimination of bronze bushings where repair is greatly hampered without them. Split cams should be used where removal of plain cams would be difficult. Built-in motors, clutches and main drives should be given special attention from this point of view. Especially, care should be taken that all parts are plainly identified for ease of replacement.

Eliminate delays

Consistent operation requires that the equipment be designed to accept and pass through occasional faulty glass without breaking the glass or altering its ability to handle subsequent normal glass. For serious abnormalities in dimension, automatic rejection means, possibly of an electronic nature, should be considered. Faulty glass or positioning should not cause breakage or permanent distortion of machine parts, or change the setting. The percentage of defective glass is, of course, very low, but breakage in the machines magnifies it a hundred or a thousand-fold as far as output is concerned, and makes for a very appreciable cost factor. Some limit of pressure should be designed into any movement acting on the glass, either by the use of spring releases, by using the limitation inherent in hydraulic movements or by other means. Synchronization of the several machines in an automatic line will help, especially if the present piling up at latches is avoided.

Obviously, normal glass should not be broken, yet some present designs shock the glass too close to the breaking point and result in surface bruises, with attendant reduction in ability to withstand later shocks along the line. Occasionally, difficulties at the glass manufacturers result in glass of less than normal strength. Improper annealing due to trouble with the lehrs, or so-called "cordy" inhomogeneous glass due to pulling on the tanks too fast, may cause breakage where the impact is severe. Abrupt movements in any of the machines cause spills and consequent clean-up delays, even after the capping station when a cap is missed.

With all this taken into account, there still will be leakers, with openings too small to release the filling vacuum. Therefore, the path of travel should be easily cleaned and provision made to prevent spillage from reaching other parts of the equipment or soiling the floor. More thought should be given to link belt conveyors whose pins are "frozen" by the products which may leak or spill out of the bottles.

Retain initial quality of output

Consistent operation requires also that as a machine wears, the quality or speed of output should not be affected and this wear should not introduce the necessity of judgment in the set-up adjustments. It is far better to replace parts from time to time, such as nozzle rubbers or label-pressure pads, rather than to alter the setting to compensate for their wear. This is the maintenance man's province, but design opportunities exist in the compensation of variables caused by cam and cam roller wear. This latter point may be closely related to the limitation of maximum pressures previously referred to.

That a machine must be safe to operate cannot be too strongly stressed. Most bottling equipment is poor in this respect. There are many positions which can crush fingers and break bones and while operators should not get near them with machines in motion, carelessness or over-confident familiarity

should not have this opportunity of causing accidents. Again, limitations of pressures should help in many cases.

In others, only guards can really make it safe. The design of these guards should be such that the machine will not operate when they are displaced. Where motions must be observed in a diagnosis of trouble, the guards can well be made of transparent plastic materials. Flying glass in an operator's eye is inexcusable. Equally so is a broken finger or arm. Yet today while they may not have even happened in some plants, the possibility and even the probability is there.

Improve over-all design

Sleek appearance and functional design are desirable for several reasons. Attractive working conditions, developing pride in cleanliness and generating a feeling of design competence have been mentioned. Another is that such designing often goes far toward guarding dangerous conditions, enveloping them with smooth contours. Opposed to this covering up is the reasoning that lubrication will be overlooked if parts are hidden, but if more attention is given to the designing out of these conditions as suggested above, several dividends are obtained at the same time.

The design of the machine should include all accessory equipment as integral parts of the main unit, hidden perhaps, yet accessible. Pumps, switch boxes and fuse panels are examples. Push buttons or toggle switches should be the means of controlling automatic equipment, plus built-in automatic shutoffs with tell-tales to stop the machine when something goes wrong.

This unity will aid much in providing flexibility of use. Machines then can be provided with casters or other means making for portability. This will be helpful in many types of plants. Variable speed drives add further to flexible use and means for adjusting the working height should not be neglected.

The orphan small bottle

The need has been mentioned for several new accessory machines, but not to be omitted is the very real desire for junior models of current machines. True, a large proportion of mechanically handled glass is in the quart and pint sizes, and today most machines are built with these in mind. But there is also a large volume of glass to be handled from 1/4 oz. to 2 oz., evidenced by drug-store shelves and chain-store counters.

Automatic machines designed primarily to handle quarts have been adapted fairly successfully to handle some bottles as small as 1/2 oz., but it is very much like cracking a nut with a steam roller. Smaller editions to handle the smaller sizes would be welcomed for several reasons. The lower cost would open up new opportunities for mechanizing, and floor space would be conserved.

Where and how

In all of these comments, the attempt has been toward constructive criticism and toward visualizing the broad problem of mechanization from the experience of users rather than from the view of the equipment builders. Yet there is no thought of belittling the very real progress that has been made in this field in the past by the ingenious designers of various types of packaging equipment. Rather, the intent is to say hopefully, "Let's not be content with minor improvements."

How this can be accomplished is a wide open question. Designers have, no doubt, been (Continued on page 156)



Natural kraft cartons like the one in the foreground are replacing white ones in this first-aid kit, since it has been discovered that white labels and boxes make perfect enemy targets.

Camouflage to balk snipers

A piece of white gauze, a white carton or a white label on medical supplies that save the lives of thousands make perfect targets for Jap snipers.

This information brought back recently by an Army medical officer from Guadalcanal has started a whole program of camouflaging medical supply packages.

Among them is this new first aid kit prepared as standard equipment for pneumatic life rafts. The unit consists of six folding carton packets containing the following: sulfadiazine tablets, bandage compresses, sulfanilamide, boric acid ointment, morphine syrettes and iodine applicator.

Original cartons were white paperboard. Later ones, as shown in the foreground of the photo, are being made of kraft board, which provides a neutral color that blends with almost any kind of scenery the same as khaki uniforms and other camouflaged matériel. Bandage compresses contained will also be dyed so they will not be dead white and distinguishable.

The cartons are enclosed in heat-sealed laminated cellophane envelopes which will withstand 48 hours' submersion, meeting with Government specifications. The carton packets are then enclosed in a kraft sleeve which is inserted into a waterproof bag of laminated kraft, metal foil, asphalt and

cellophane, similar to the flexible waterproof material used widely in medical supply packaging.

This waterproof bag is then placed in a kraft carton sealed with moistureproof glue. The kraft sheet for the outer carton unit, before die-cutting, is treated with a coating of micro-crystalline and paraffin wax to make it weatherproof and to withstand temperatures for both tropics and arctics. This wax penetrates the kraft about 4 pts. on each side of the board, thereby giving adequate protection. The mixture is such that it will not melt at tropical temperatures nor crack in arctic ones.

The packets are delivered to a central place from the various drug houses for assembly. Identification is a Red Cross to indicate that the package is a medical supply. Because it will be used for both Army and Navy, the further designation is simply U. S. Government.

It is reported that labels on containers for blood plasma and other medical supplies are also being colored to blend with outdoor backgrounds. Natural kraft paper makes a good camouflage packaging material, without further color treatment.

Credit: Cartons, Berles Carton Co., Inc., Paterson, N. J.



WAR

BONNET



THE development of screw-type and lug-type paper closures to cap standard-sized glass containers was as logical as it was necessary.

Without these paper "war bonnets", many products would have no way of getting to market, consumers would have no way to buy them.

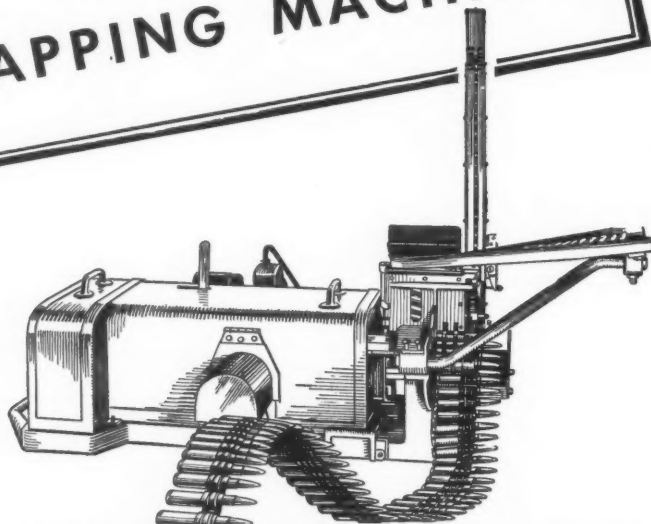
Burt has been glad to be of service in making this development available to as many industries as possible. This, and our other contributions to wartime packaging, give further example of the type of intelligent and resourceful service we render at all times.



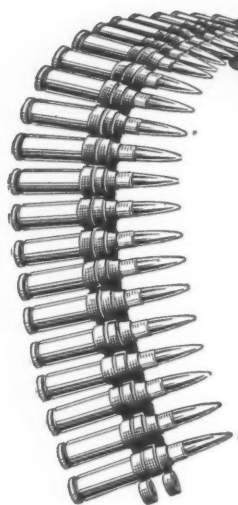
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50-cal. machine gun bullets, for example, are linked at a speed of 150 per minute by a new machine of our invention and manufacture which has proved so successful that hundreds are now serving the armed forces. Portable, comparatively light in weight and operated by power or by hand, this machine can follow the fighting and be used in the most advanced positions.

Other machines built by us are used for piercing and priming cartridges, loading them with powder and projectile, inserting them into clips, packing them into cartons, etc.

The inventive talent, engineering ability and craftsmanship required for this type of work will lead to faster, more efficient and more versatile wrapping machines. *We are ready now to study your postwar wrapping plans.*

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EDITOR
CHARLES A. SOUTHWICK JR.

1—Its molecular alignment is largely responsible for Saran's strength, flexibility and peculiar dimensional stability. X-ray diffraction pattern reveals the film's crystal structure.

SARAN FILM

Its properties and postwar potentials as a moisture-proof packaging material.

by F. J. MacRae¹ and H. L. Schafer²

Vinylidene chloride was first mentioned in chemical annals over a century ago, but little or no active investigation was carried on until the last decade. At this time, the Dow Chemical Co. investigated the material while working on chlorinated aliphatic compounds. This preliminary study soon led to an extensive development program and early in 1940 the first vinylidene chloride polymers³ were introduced commercially under the trade name Saran.

Possessing unusual characteristics for a thermoplastic material, Saran found immediate acceptance in uses requiring chemical inertness, high strength, toughness and good resistance to the absorption of water. Molding granules, monofilaments, pipe and tubing, as well as pipe and tubing fittings, were soon developed to the production stage in 1942. In the same year, a thin, one mil film of Saran was developed that had all the physical properties of the parent material and, in addition, was very flexible.

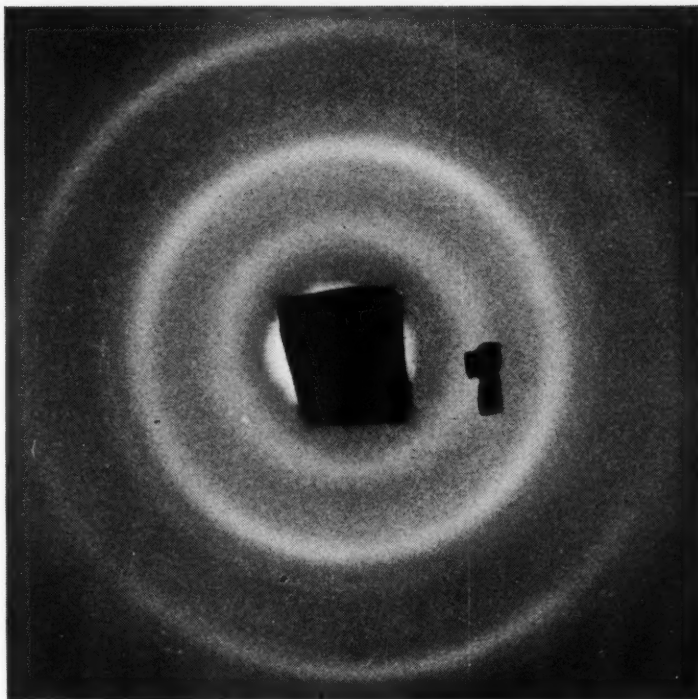
Results of tests showed that this film of Saran had an exceedingly low rate of moisture-vapor transmission, could be welded like the other Sarans and possessed a very high tensile strength for a thin plastic membrane. Characteristics such as these indicated the possibility of the film's use as a packaging material. Extensive research and development work made it possible to introduce vinylidene chloride commercially as a packaging medium for war use under the trade name, Saran film Type M, early in 1943.

¹ Plastics Development Division, The Dow Chemical Co., Midland, Mich.

² Saran Development Laboratory, The Dow Chemical Co., Midland, Mich.

³ U. S. Patent 2,160,931.

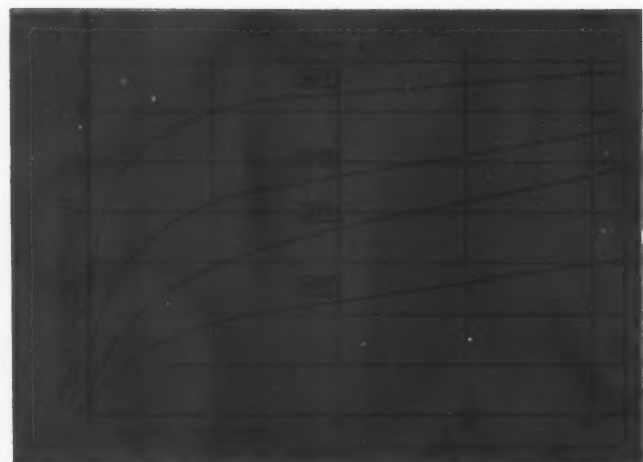
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Chemically, polyvinylidene chloride is the polymer of unsymmetrical dichlorethylene and is produced from brine and petroleum. Chlorine liberated by the electrolysis of brine and ethylene made by the cracking of petroleum are combined to form Trichlorethane which in turn is converted to vinylidene chloride. This clear colorless liquid which boils at 31.7 deg. C. is polymerized to form the long, linear, straight chain polymer, polyvinylidene chloride. Following the polymerization, a plasticizing and stabilizing agent is added to the fine granular polymer which is then ready for fabrication into Saran film by means of specially designed mechanical equipment.

Saran film is a nearly colorless, transparent, flexible sheeting which shows remarkable properties of strength, pliability and moistureproofness. Whereas other fabricated thermoplastic materials exist in the amorphous state, Saran is normally crystalline in nature. However, in a molten condition, the resin is amorphous and readily crystallizes when cooled to room temperature. The process of crystallization may be expedited by mechanical working, resulting in molecular alignment, or orientation. This molecular alignment is responsible to a great extent for the film's properties of strength, flexibility, and peculiar dimensional stability. As can be seen from Fig. 1, an X-ray diffraction pattern of the film exhibits a crystal structure similar to that of a cold worked metal.

At the present time, Saran film is produced in one grade only, Type M, which is suitable for the packaging of metal parts and assemblies according to the Method II Pack



wherein a desiccant is used. The film is available in the form of continuous rolls 15 in. or less in width and in two gauges, 125 and 225. The thickness and tolerance limits on these gauges are as follows:

Gauge	Thickness	Tolerance
125	0.00125 in.	± 0.00025
225	0.00225 in.	± 0.00025

Saran film appears to be the most chemical-resistant sheeting now offered to the trade. Many products heretofore restricted to packaging in glass or other special type containers may be safely stored or packaged in a relatively inexpensive Saran-lined container. Of particular value is its use in the packaging of corrosive or anhydrous materials which require the additional protection of a moisture barrier. Saran film possesses the same high degree of chemical resistance as Saran pipe and tubing. Table I is a condensation of the resistance of Saran to the more common types of chemical compounds.

TABLE I.—CHEMICAL RESISTANCE OF SARAN FILM
Room temperature

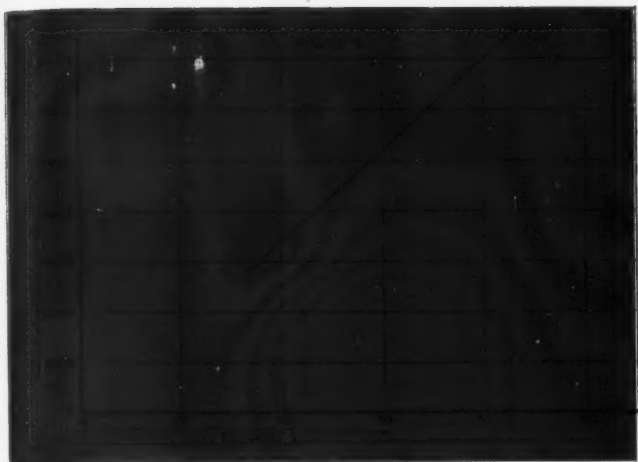
Mineral acids:	
Dilute.....	Excellent
Concentrated (except H_2SO_4 and HNO_3).....	Excellent
Organic acids.....	Excellent
Alkalies (except NH_4OH).....	Good
Oils, fats and waxes.....	Excellent
Solvents:	
Alcohols, aliphatic hydrocarbons.....	Excellent
All other types.....	Good to fair

NOTE.—Chemical resistance decreases with increase in temperature.

Resistance to the passage of moisture vapor is one of the most unusual properties of Saran film. Because of its high degree of elasticity and toughness, the film may be creased or folded repeatedly without affecting this property. The moisture vapor transmission rate as measured using a pyrex glass cell, anhydrous calcium chloride desiccant and the General Foods' moisture-vapor test cabinet at 100 deg. F. and 90 per cent relative humidity is shown graphically in Fig. 2. As illustrated, the moisture-vapor transmission rate is inversely proportional to the film thickness. However, unlike other moistureproof films and laminates, the rate is not constant but decreases as shown in Fig. 3. This is a plot of the instantaneous moisture-vapor transmission rate upon aging the film at 100 deg. F. and 90 per cent relative humidity for the times indicated.

Fig. 3 is a representation of the expected decrease in moisture-vapor transmission under normal aging conditions for a period of 10 to 12 months. The drop in transmission occurs as a result of the loss of plasticizer from the film, the plasticizer acting as a carrier by which a limited amount of moisture may be transmitted. Upon aging or at increased temperatures, crystallization proceeds, forcing this plasticizer to the surface where it volatilizes. This loss does not adversely affect the physical properties, as shown in Table II. Fig. 4 illustrates the volatile loss with time at various temperatures.

The water absorption of Saran film is extremely low; the increase in weight is less than 0.02 per cent after seven days' immersion in water at room temperature. This property, together with its low moisture-vapor transmission, makes the film ideal for use as a moisture-impervious barrier.



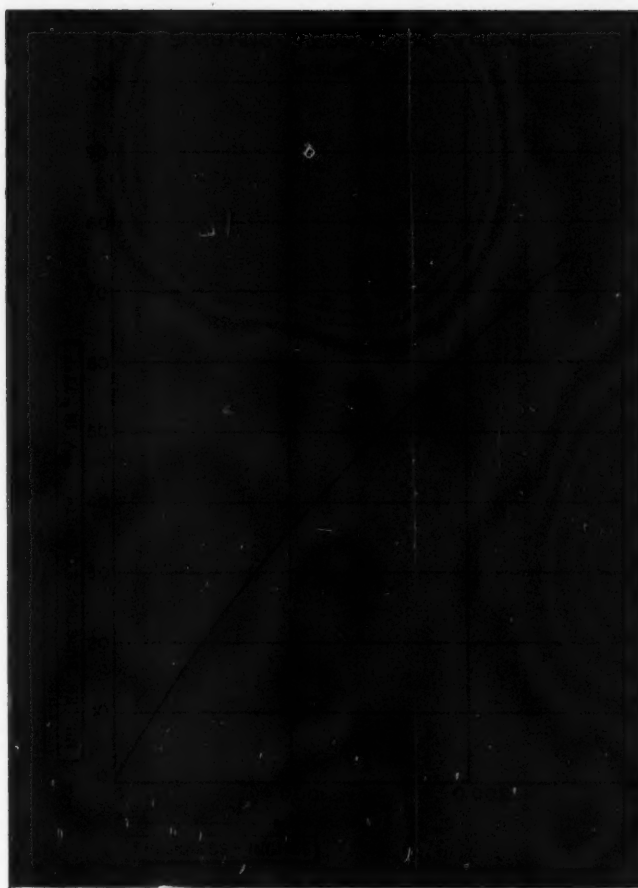
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The transmission of gases, as well as moisture vapor, through Saran film is extremely low. Recent emphasis placed on such rates of transmission of thin plastic membranes for commercial application places the film in an enviable position. Several types of gases have been tested, namely, helium, hydrogen, carbon dioxide, oxygen and nitrogen. The rates in liters/sq. meter/24 hrs. for a 125-gauge film ranged from not more than 0.70 to not less than 0.01 for the gases in the respective order as listed above.

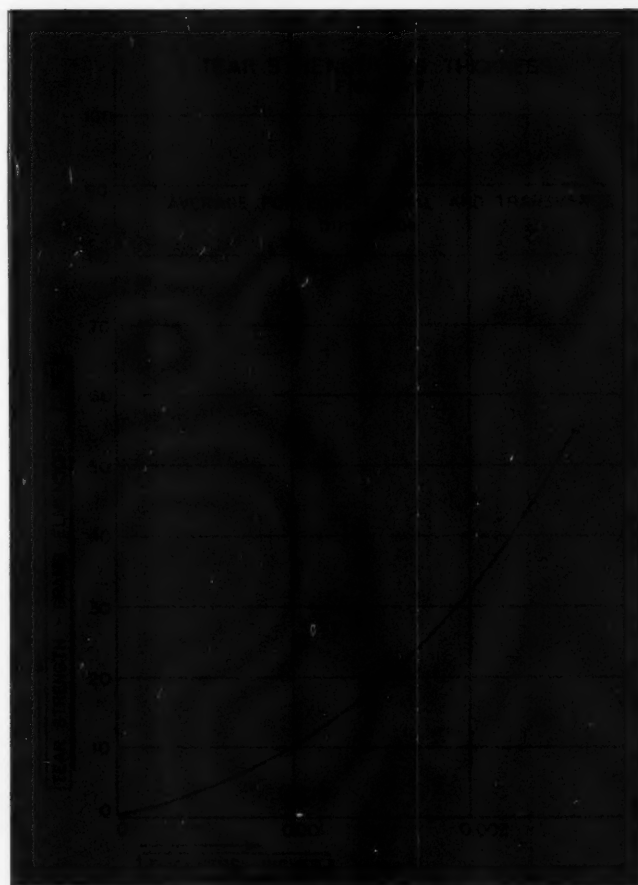
The extreme toughness of Saran film may best be illustrated by observing the tensile and bursting strengths as plotted in Figs. 5 and 6. The process used in making Saran film produces a product having high orientation and correspondingly high strength in the transverse direction of the material and limited orientation and somewhat lower strength in the longitudinal direction. As shown in Fig. 5, within the working range the tensile strength is proportional to the degree of orientation. Thus, the tensile may vary from approximately 6,000 to 15,000 lbs./sq. in., depending upon the orientation. Actually, the film, as presently produced, ranges from 7,000 to 11,000 lbs./sq. in. The variation in bursting strength with gauge is illustrated in Fig. 6 and, as may be observed, is quite high. As additional evidence of the toughness, a 1-in. diameter steel ball weighing 67 grams may be dropped from 5 ft. to 6 ft. at room temperature on a tautly held 125-gauge film and from 10 ft. to 12 ft. on a 225-gauge film before rupture occurs. At 0 deg. F. the rupture points are 2 ft. and 5 ft., respectively.

Saran film normally exhibits a high resistance to tear but like most other flexible, transparent, plastic membranes shows

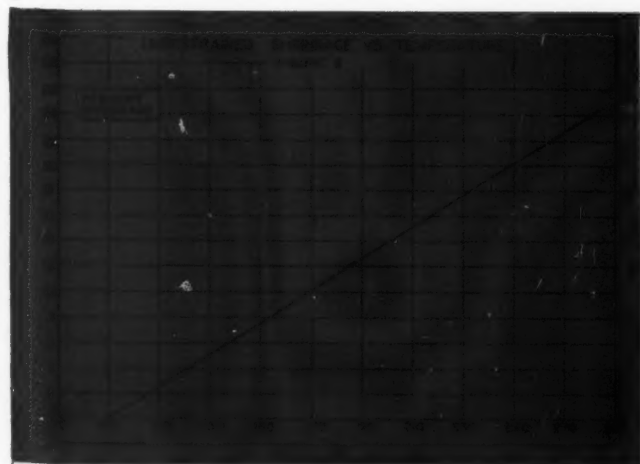
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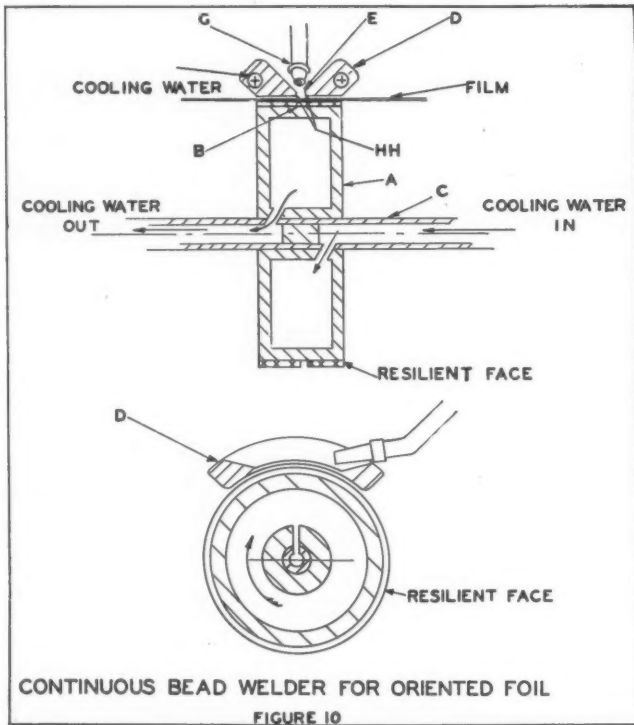
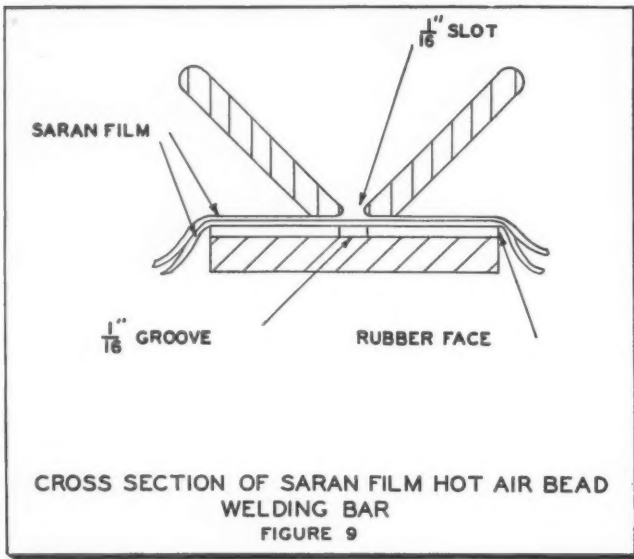


Figs. 2, 3 and 4 show Saran's resistance to the transmission of moisture, vapor and volatile gases. Figs. 5, 6, 7 and 8 portray the physical properties of the film.

low resistance once a tear has been started. Fig. 7 illustrates the relation of thickness to this property.

When exposed to temperatures above 85 to 95 deg. F., Saran film will shrink when unrestrained to the extent illustrated in Fig. 8. However, a slight restraining force readily prevents this shrinkage. Above 160 deg. F. this unrestrained shrinkage occurs within a matter of seconds. This is a result of the stress present in the material due to mechanical working or orientation the film is subjected to during manufacture. Advantage may be taken of this property in the fabrication of skin-tight coverings by loosely wrapping the package or container and then exposing it to a temperature sufficient to shrink the film down onto the surface.

Saran film does not present a fire hazard either from the standpoint of use or fabrication, as the base material is self-extinguishing. When exposed to heat, the material first shrinks, then melts, and if an open flame is applied it will chemically decompose, but it will not support combustion. When the flame is removed, decomposition stops.



Problems of storage and handling of prefabricated shapes are relatively simple. The only consideration necessary is that of elevated temperatures. Care should be exercised not to store the material near steam pipes, radiators or other excessive heat because of the possibility of shrinkage.

Upon exposure to climatic conditions, Saran film does not embrittle or change adversely in physical characteristics. Some discoloration, however, occurs. Some of the physical properties actually improve upon aging, notably the moisture-vapor transmission rate. Effect of outdoor exposure on Saran film for one and three months' periods is listed in Table II.

TABLE II.—EFFECT OF AGING ON 125-GAUGE SARAN FILM			
	Unexposed	1 Mo.	3 Mo.
MVT (grams/100sq.in./24hrs.)	.25	.13	.13
Tensile strength (lbs./sq.in.)	8,900	7,500	7,500
Bursting strength (lbs./sq.in.)	38	39	41
Tear strength (grams Elmendorf)	17	17	15
Elongation (per cent)	22	27	35
Flexibility	Excellent	Unaffected	Unaffected

Table III lists the properties of 225-gauge Saran film at room temperature.

TABLE III.—PROPERTIES OF SARAN FILM—TYPE M	
(All data referred to were obtained from 225-gauge film at 77 deg. F. and 50 per cent relative humidity)	
General	
Specific gravity.....	1.68
Specific volume—cu. in./lb.....	16
Area factor—sq. in./lb.....	7,000
Moisture-vapor transmission:	
Grams/100 in. ² /24 hrs. at 100 deg. F., 90 per cent RH diff.....	0.20
Water absorption—1 week at 77 deg. F.....	0.02%
Thermal	
Melting point.....	310–330° F.
Burning rate—A.S.T.M. D568-40.....	Self-extinguishing
Specific heat—cal./deg C./gram.....	0.32
Thermal conductivity—	
cal./sec./cm. ² /deg. C./cm.	2.2×10^{-4}
Resistance to heat—up to 125 deg. F.—cont.....	Excellent
Resistance to heat—up to 170 deg. F.—inter.....	Good
Resistance to cold—tested to –20 deg. F.....	Good
Mechanical	
Tensile strength—lb./in. ²	7–11,000
Elongation—per cent.....	25–35
Bursting strength—lb./in. ²	68
Drop impact—(1 in. steel ball)—ft.:	
77 deg. F.....	10'
32 deg. F.....	8'
0 deg. F.....	5'
Folding endurance (M.I.T.).....	not less than 500,000
Optical	
Refractive index.....	1.61
Transmission of white light.....	90%
Ultraviolet cut-off.....	3,500 Å
Transmission of infra-red.....	90%
Electrical	
Dielectric constant:	
1000 cy.....	2–4
1,000,000 cy.....	2–4
Percent power factor:	
1000 cy.....	10–13
1,000,000 cy.....	3–5
Dielectric strength, volts/mil.....	5,000

Saran film can be joined by three methods of heat sealing, namely, hot air bead welding, an improved type of continuous heat sealing and high frequency welding.

The first method, commonly called the hot air method,⁴ produces a neat, strong and vapor-tight seal with the film. This method takes advantage of Saran film's shrinking characteristics when exposed to extreme heat. The two layers of film to be joined are clamped between two bars as shown in Fig. 9. The upper bar has a $\frac{1}{16}$ -in. wide slot at its bottom, which is chrome plated and highly polished. This bar is clamped to the lower one by a suitable clamping device, and holds the film firmly over the $\frac{1}{16}$ -in. groove in the resilient rubber face of the lower bar. This leaves a $\frac{1}{16}$ -in. wide strip of the film exposed. A jet of hot air (about 575 deg. F.) is directed into the opening of the upper bar against the narrow exposed section of the film, which melts into two parts and immediately shrinks back to the cool edges of the slot. Here it forms two inconspicuous cylindrical bead-like welds, one along each edge of the slot.

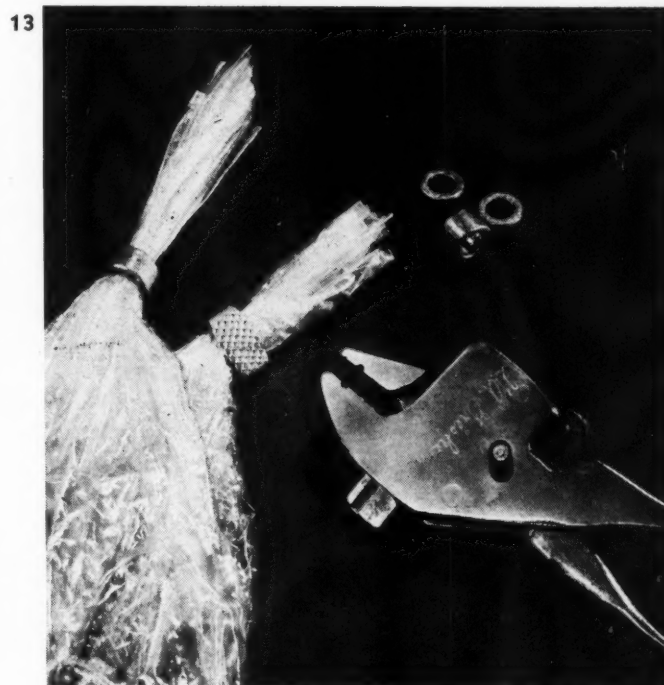
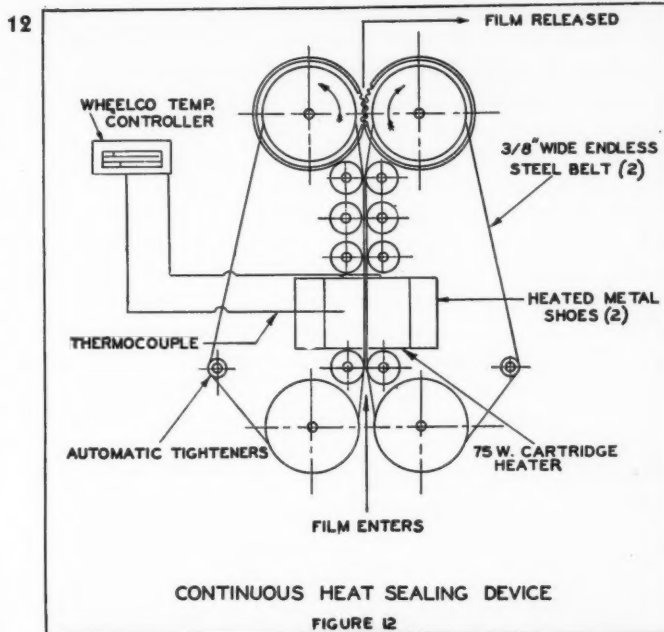
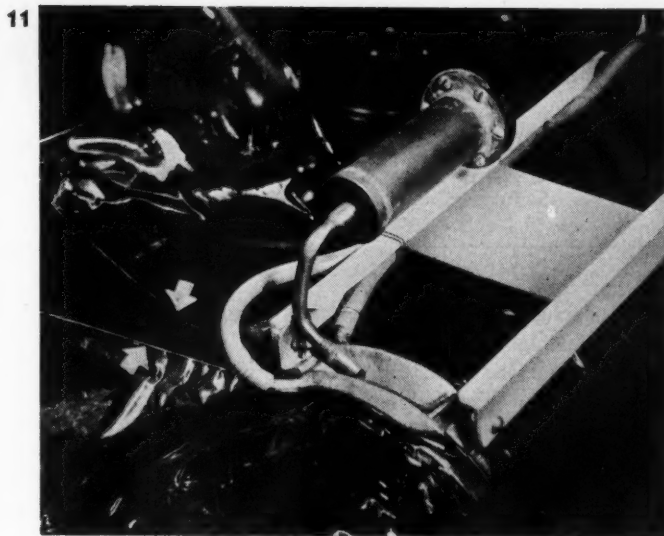
A continuous unit has been developed using the same basic principles as mentioned before. This is shown in Fig. 10. The upper bar *D* is made curved to fit a rubber-covered drive cylinder *A*, which replaces the lower bar. Clamping pressure of about 5 lbs./sq. in. is applied by spring tension to the curved upper bar, or segment *D*, which is chrome plated and highly polished. This segment *D* has a $\frac{1}{16}$ -in. by 2-in. slot *E* which matches the $\frac{1}{16}$ -in. wide groove *B* in the resilient face *H-H* of the driving cylinder *A*. The driving cylinder *A* and the segment *D* are cooled by circulating cold water through the openings as shown in Fig. 10. Hot air is directed through a $\frac{1}{8}$ -in. nozzle *G* at from 475-575 deg. F. into the slot *E* at about a 45-deg. angle. Room temperature air at the rate of $\frac{1}{4}$ to $1\frac{1}{2}$ cu. ft./min. is heated in a 550-watt open coil heating element. This delivers sufficient air to the exposed surface of the film to produce 6 to 8 linear feet of weld per minute.

As may be seen by Fig. 11, this unit produces two complete welds with each cut. Production units capable of producing several tubes at one operation can be built up from two or more of these units. Welds produced by this method on 225-gauge Saran film will support from 7 to 8 lbs./linear inch and 5 to 6 lbs. on the 125-gauge stock. Results of tests have shown the welds to have a lower moisture-vapor transmission rate than the parent material.

Due to Saran film's orientation and comparatively sharp melting point, attempts to use conventional heat-sealing devices in general have not been too satisfactory. A recently developed continuous heat-sealing device, as shown in Fig. 12, has overcome difficulties encountered with the heated bar and roller types of conventional units. The film to be joined is supported by the two thin chrome-plated or stainless metal belts which are tightly held together. These belts carry the film through a cool zone, a hot zone and a second cool zone before it is released. Shrinking is minimized due to the belts supporting the film through the heated zone and a second cool zone where the material (Continued on page 152)

⁴ U. S. Patent 2,220,545.

9 and 10—Two recommended setups for hot-air bead welding of Saran film. 11—Continuous welding unit produces two complete welds with each cut. 12—Setup for continuous heat-sealing. 13—Sealing with soft lead rings may be done without the use of heat-sealing devices.



What makes cans corrode in V-boxes?

Full laboratory report supplements QMC tests, comparing corrosion resistance of various boxes and analyzing conditions under which corrosion is most apt to occur in overseas shipments.

The problem of corrosion of metal containers in V-boxes reared its ugly head in mid-summer. The container manufacturers and the Quartermaster Corps cooperated in preliminary tests to determine causes and correct the situation, if possible (see special insert opposite page 74, MODERN PACKAGING, September 1943).

The New York State College of Forestry has just completed another investigation marked by extreme scientific accuracy, the method and results of which follow. This investigation, sponsored by The Eastern Box Co., was under the direction of Dr. C. E. Libby, professor of pulp and paper manufacture, assisted by F. W. O'Neil, assistant professor in the same department, in cooperation with Arno W. Nickerson, consulting engineer.

Their objective was to determine what were the objectionable characteristics of V-boxes manufactured for overseas shipment of foodstuffs packaged in tin cans. Corrosion of these tin cans had been experienced in the use of the boxes of The Eastern Box Co. as well as those of other manufacturers. The purpose of the investigation was to compare the products of several box manufacturers for their properties in promoting or inhibiting the corrosion of tin cans and to determine, if possible, the specific conditions under which maximum corrosion occurred. The manufacturers' names, of course, have been withheld in the complete report which follows, but the sponsor of the project very courageously makes public the facts, even though his own products did not come out first.

Container submitted for investigation

A shipment of 80 solid fibreboard containers was received on September 17, 1943. Each container was fitted with a sleeve composed of the same material as the box. The shipment consisted of the following types:

CODE A. Twenty V-1-S boxes composed of four plies of Southern Kraft Corp.'s .025 kraft, laminated with a 20 per cent solution of urea-formaldehyde resin and starch.

CODE B. Twenty V-1-S boxes composed of 4 plies of West Virginia Pulp & Paper Co.'s .012 kraft liner laminated to make .025 board with a urea-formaldehyde resin and starch. The four plies were laminated with Du Pont weatherproof No. 77, a polyvinyl alcohol base adhesive.

CODE C. Twenty V-2-S boxes composed of jute filler laminated with urea-formaldehyde resin and starch. The top and bottom liners were laminated to the jute filler with an asphalt adhesive.

CODE D. Twenty V-3-S boxes composed of high test filler chip board with kraft liner top and bottom which had been laminated with Du Pont weatherproof adhesive No. 77.

Sixty No. 10 cans, sealed top and bottom, were shipped in each box. Upon arrival the cans were examined for rust spots.

All cans were found to be entirely free from corrosion. The cans were manufactured by the American Can Co.

Sixty cans of similar construction were delivered to the College laboratories by the Syracuse plant of the Continental Can Co. These cans were used to replace the cans in two boxes of each manufacturer for purposes of comparison.

Preparation for testing

The boxes were sealed top and bottom with Du Pont weatherproof No. 77, a polyvinyl alcohol base adhesive, and allowed to stand 16-18 hours under pressure to make certain of a tight seal. The boxes were then segregated for testing as follows:

V-1-S CODE A

- 10 boxes to kiln with sleeve.
- 5 boxes to kiln without sleeve.
- 5 boxes to kiln after sealing all openings with Solseal 30/30/30 waterproof tape.

V-1-S CODE B

- 10 boxes to kiln with sleeve.
- 5 boxes to kiln without sleeve.
- 3 boxes to kiln, after allowing 8 per cent additional moisture to collect on box with sleeve.
- 2 boxes to kiln after sealing with Solseal 30/30/30 waterproof tape.

V-2-S CODE C

- 10 boxes to kiln with sleeve.
- 3 boxes to kiln after allowing 8 per cent additional moisture to collect on box with sleeve.
- 5 boxes to kiln without sleeve.
- 2 boxes to kiln after sealing with Solseal 30/30/30 waterproof tape.

V-3-S CODE D

- 10 boxes to kiln with sleeve.
- 5 boxes to kiln without sleeve.
- 5 boxes to kiln after sealing with Solseal 30/30/30 waterproof tape.

Testing procedure

The fibreboard boxes were placed in a specially designed rack as shown in the accompanying photographs and were located according to the diagram, Fig. 1.

The rack was placed in the dry kiln at the New York State College of Forestry. This kiln is 8 by 8 by 20 ft., constructed of hollow tile wall 8 in. thick and with a 12-in. asphalt covered cork roof. The temperature and humidity of the air in the kiln are controlled by means of Taylor Instrument air-operated valves. The temperature is maintained by steam heating coils and is controlled within ± 1 deg. F. The instrument also records the wet bulb and dry bulb temperature. A fan is used to circulate the air in the kiln.

In order to simulate conditions of high temperature (140 deg. F.) with high humidity (98-100 per cent R.H.) and condensation of the water vapor due to cooling, the following schedule was adopted:

24 hrs with steam on—temperature and relative humidity controlled by Taylor Recording instrument at 140 deg. F., 98–100 per cent R.H.

24 hrs. with steam off, kiln allowed to cool to outside temperature (60 deg. F.)

This schedule was repeated every 48 hours during the entire test. Boxes were removed from the kiln every 72 hours. The boxes were examined and tested for Mullen burst and ply separation and the cans were examined for rust spots.

Discussion of results

The Government specifications for solid fibreboard boxes designated as V-1-S list minimum bursting strength average as 750 lbs. per square inch dry, and 500 lbs. per square inch after soaking in distilled water for 24 hours and a minimum caliper dry of .100 in. The V-1-S box, Code A, had a dry Mullen of 679 lbs. per square inch, a wet Mullen after immersion for 24 hours in distilled water at 73 deg. F. of 441 lbs. per square inch and a dry caliper of .110 in. The V-1-S box, Code B, had a dry Mullen of 794, a wet Mullen after immersion for 24 hours in distilled water at 73 deg. F. of 514 and a dry caliper of .110 in.

The Government specifications for V-2-S solid fibreboard list a minimum dry bursting strength of 550 lbs. per square inch and a minimum wet bursting strength of 500 lbs. per square inch and a minimum dry caliper of .09 in. The V-2-S box, Code C, had a dry Mullen of 533 and after immersion for 24 hours in distilled water at 73 deg. F., a wet Mullen of 441 and a caliper of .096 in.

The Government specifications for solid fibreboard containers designated as V-3-S list minimum dry bursting strength of 400, a minimum wet bursting strength of 150 and a minimum dry caliper of .09 in. The V-3-S box, Code D, had a dry Mullen of 489 lbs. per square inch and a wet Mullen after immersion in distilled water at 73 deg. F. for 24 hours of 227 lbs. per square inch and a caliper of .11 in.

Results of 72-hour kiln treatment

After this period of treatment, the boxes were opened and the cans examined for corrosion. The cans in the V-1-S box, Code A, placed in the kiln without a sleeve showed considerable rusting around the top and bottom closure and the side seams. The rust spots on the body of the can seemed to be perpendicular to the side seam and were about .025 in. wide and .05 to .375 in. long.

The tops and bottoms of cans also showed rust when in contact with the box. The cans in the V-1-S box, Code A, placed in the kiln completely sealed with Solseal weatherproof tape showed some corrosion of the same general nature as the other box, but not quite as extensive. No condensation was noted in the sealed box.

The boxes withstood the effect of changing temperature and humidity without appreciable change. The average bursting strength was 867 lbs. per square inch as compared to 679 lbs. per square inch for the original. (Note: In this case the box itself was tested after being in the kiln. All other tests are on the sleeve.)

The cans in the V-1-S box, Code B, showed corrosion around the seams and on the lip at ends. This corrosion was not very heavy. The cans in the box with the sleeve showed considerably more corrosion than the cans in the box without sleeve, 15 to 25 spots per square inch as compared to 4 spots per square inch. One box previously exposed to high humidity to increase the moisture content and then filled with cans and sealed, was removed at this time. The additional moisture

in the box did not increase the amount of corrosion. The cans in this box showed about the same amount of corrosion as cans in the box sealed without the sleeve, about 3 spots per square inch.

The boxes withstood the effect of changing temperature and humidity without an appreciable deterioration. The average bursting strength was 768 lbs. per square inch as compared to 794 lbs. per square inch for the original container.

The V-2-S container, Code C, was opened after 72 hours' treatment. The cans were in excellent condition and were entirely free from corrosion. This condition was noted in the box with the sleeve, the box without the sleeve and the box which was conditioned to 13 per cent moisture before placing the cans in the box and sealing it.

The boxes withstood the effect of changing humidity and temperature without appreciable change. The average burst for the boxes removed from the kiln was 520 lbs. per square inch in comparison with 533 lbs. per square inch for the original boxes.

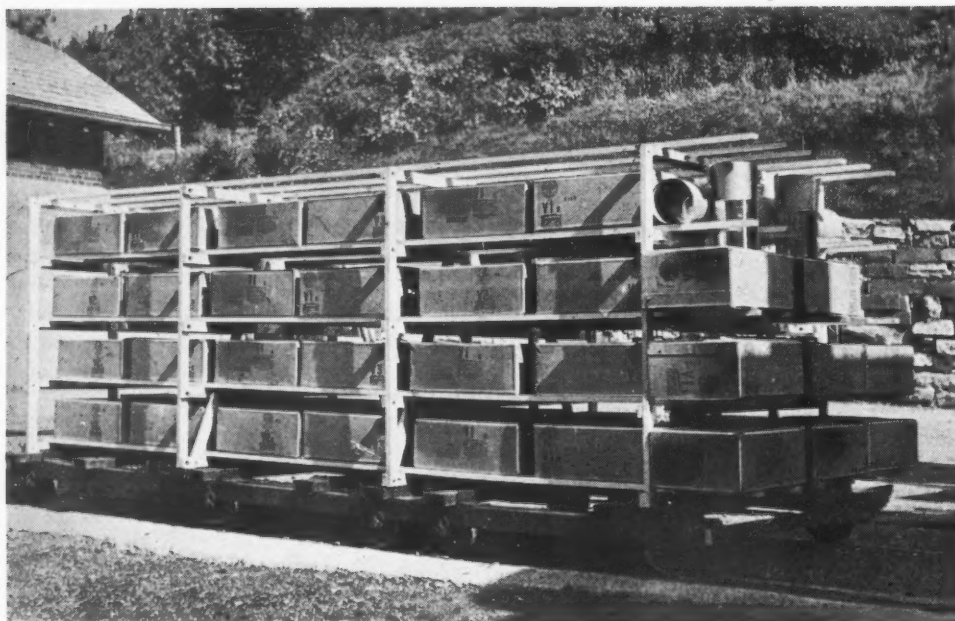
The V-3-S container, Code D, was opened after 72 hours' treatment. Slight corrosion was noticed on the cans in the box fitted with a sleeve. About three spots per square inch were noted. These spots were about .03 in. in diameter. The cans in the box sealed without the sleeve were less corroded than the cans in the one with the sleeve. There were about 1–1.5 spots per square inch and these spots were about .03 in. in diameter. The cans in the box completely sealed with Solseal waterproof tape were only slightly corroded at the seams. No condensation was noted in this box.

The boxes were in good condition. The average burst for the boxes removed from the kiln was 498 lbs. per square inch as compared to 489 for the original container.

Another set of boxes were removed from the kiln after this

ARRANGEMENT OF BOXES FOR KILN TREATMENT								
A-2 144 B-2	A-4 360 B-4	C-4 360 D-4	C-1 144 D-1	A-2 288 B-2	B-3 216 C-3	A-1 144 B-1	C-1c 360 C-1	A-4 216 B-4
A-4 144 D-4	D-1c 360 D-1	B-3 360 C-3	A-1 216 B-1	C-2 360 D-2	A-2 360 B-2	C-2 144 D-2	C-2 288 D-2	C-4 216 D-4
Top Tier			Second Tier					
C-2 72 D-2	A-1 288 B-1	C-1 288 D-1	A-1 72 B-1	A-1c 216 B-1c	C-1 216 D-1	C-1c 72 D-1	A-1c 360 A-1	C-1c 216 D-1c
B-3 72 C-3	B-1c 360 B-1	A-1 288 B-1	A-2 72 B-2	C-2 216 D-2	A-2 216 B-2	A-1 360 A-1	A-1 360 A-1	B-1 360 B-1
Third Tier			Fourth Tier					

Fig 1



Arrangement of the fibre-board boxes on the specially designed rack ready for the kiln treatment. The rack was then placed in the dry kiln at the New York State College of Forestry and tested with extreme accuracy.

period of treatment. Mr. Kronquest, chemist of the Continental Can Co., Syracuse plant, was present when these boxes were opened.

The cans in the V-1-S box, Code A, sealed and with sleeve, were very badly corroded, especially at the seams and were considered unmarketable. The cans in the V-1-S box without the sleeve were moderately corroded on the body of the can and quite heavily corroded at the seams. Cans were very nearly unmarketable. The cans in the V-1-S box completely sealed with Solseal waterproof tape were corroded although not to an excessive degree. No condensate was noted in the sealed box.

The average bursting strength for the boxes in the kiln was 694 in comparison with 679 for the original box.

The cans in the V-1-S boxes, Code B, and in the kiln for 144 hours were examined. The cans in the box sealed and with the sleeve were excessively corroded and considered unmarketable as were the cans in the box sealed without the sleeve. Very heavy corrosion was noted at the seams.

The boxes were in excellent condition. The average bursting strength of the boxes removed from the kiln was 773 lbs. per square inch as compared to 794 lbs. per square inch for the original.

The cans in the V-2-S boxes, Code C, treated for 144 hours showed no signs of corrosion.

The average bursting strength of the boxes removed from the kiln was 523 lbs. per square inch in comparison with 533 lbs. per square inch for the original container.

The cans in the V-3-S boxes, Code D, were examined after 144 hours in the kiln. The cans in the box sealed and with the sleeve showed fairly heavy corrosion. It was most extensive at the seams. These cans would be considered to be in poor condition. Those cans in the V-3-S box sealed, but without the sleeve, exhibited only moderate corrosion. The cans in the box completely sealed with Solseal waterproof tape were only slightly pitted on the body but with heavier corrosion at the seams.

The boxes were in good condition with no condensation showing in the completely sealed box. The average bursting strength was 497 lbs. per square inch in comparison with 489 lbs. per square inch for the original container.

After this period of treatment the boxes were removed and

the cans examined. The cans in this V-1-S box, sealed and with the sleeve, Code A, were manufactured by the Continental Can Co. These cans were very badly corroded on the top and on the seams. The body of the cans was only moderately corroded. The cans would be considered unmarketable. Another V-1-S box sealed and with the sieve contained American Can Co.'s cans. These cans were very heavily corroded at the side seam and top and bottom closure. The cans would probably be considered unmarketable. The cans in the V-1-S box sealed and without the sleeve were corroded on the side seam and top and bottom closure. These cans were moderately corroded. Most of the corrosion seemed to be localized in two or three spots on the cans. The cans in the V-1-S box sealed with Solseal waterproof tape were corroded most heavily at the seams. These cans were in better condition than the ones which were in the two containers described above.

The average bursting strength of the box removed from the kiln was 734 lbs. per square inch in comparison with 679 for the original container.

The cans in this V-1-S box sealed and with the sleeve, Code B, were manufactured by the Continental Can Co. These cans were very badly corroded on the top of the cans and at the side seams. The body of the can exhibited moderate corrosion. These cans would be considered unmarketable. Another V-1-S box sealed and with the sleeve contained cans manufactured by the American Can Co. These cans were heavily corroded at the seams and on the body of the cans. These cans would be considered unmarketable. The cans in the V-1-S box sealed but without the sleeve were heavily corroded at the seams and on the body. Although not so badly corroded as the cans in the V-1-S box with the sleeve, the cans would be considered unmarketable. Another V-1-S box was examined which had been conditioned to 13 per cent moisture before addition of cans and sealing. This box was very moist due to condensate dropping on it from the cover. These cans were heavily corroded and probably would be considered unmarketable. The cans in the V-1-S box sealed with Solseal waterproof tape were very heavily corroded at the seams. The body of the can was in fairly good condition. However, due to corrosion at the seams, the cans would probably be considered unmarketable.

TABLE I.—SUMMARY OF PHYSICAL TESTS OF BOXES TREATED IN KILN

Test	Code A V-1-S	Code B V-1-S	Code C V-2-S	Code D V-3-S
Burst,* dry	679	794	533	489
Burst,* wet	441	514	441	227
Caliper,† dry	.110	.100	.096	.110
Caliper,† wet	.155	.142	.112	.154
Burst,* 72 hrs.	867	768	520	498
Burst,* 144 hrs.	694	773	523	497
Burst,* 216 hrs.	734	735	520	472
Burst,* 288 hrs.	753	774	499	473
Burst,* 360 hrs.	648	763	495	489

Note: * Pounds per square inch.
† Inches.

The boxes were in very good condition. The average bursting strength was 735 lbs. per square inch in comparison with 794 for the original box.

The cans in this V-2-S box, Code C, sealed and with the sleeve were manufactured by the Continental Can Co. These cans exhibited very slight corrosion on the side seam. There was no corrosion on the body or covers of these cans. Another V-2-S box sealed and with the sleeve contained cans manufactured by the American Can Co. These cans felt slightly rough to the hand but very little, if any, corrosion was evident to the eye.

The cans in the V-2-S box, sealed and without the sleeve, exhibited very slight corrosion on the seams and on the top when in contact with the box. The cans were still in good condition. The cans in the V-2-S box, previously conditioned to 13 per cent moisture and sealed were in excellent condition with only very slight corrosion on the seams. The body of the can was slightly rough to the touch. The cans in the box completely sealed with Solseal waterproof tape were still in good condition. These cans were only slightly rough to the touch. The pits when found were about .01 inch in diameter.

The box itself was in good condition. The average bursting strength was 520 lbs. per square inch in comparison with 533 for the original box.

The Continental Can Co. cans in the V-3-S box sealed and with a sleeve were corroded sufficiently at the seams and on the top to cause them to be unmarketable. The American Can Co. cans in the same type of box were also heavily corroded, both on the seams and on the body of the cans. These cans would be considered unmarketable. The cans in the V-3-S box sealed but without the sleeve were quite badly corroded over the entire body of the can. The seams were fairly heavily corroded. The cans in the V-3-S box completely sealed with Solseal waterproof tape were slightly pitted on the body and very definitely pitted at the seams. The cans would be considered moderately corroded. No condensation was observed in any of the sealed boxes.

The boxes were in good condition with the average bursting strength of 472 lbs. per square inch as compared to 489 lbs. per square inch for the original box.

Results of 288-hour kiln treatment

After this period of treatment the boxes were opened and the cans examined for corrosion. The cans in the V-1-S boxes, Code A, were very heavily corroded. This condition applied to the cans in the boxes with the sleeves, without the sleeve and the box completely sealed with Solseal waterproof tape.

No condensation was observed in the latter box. The cans in all of these boxes would be considered unmarketable.

The average bursting test for the boxes after 288 hours in the kiln was 753 lbs. per square inch as compared to 679 lbs. per square inch for the original container.

The cans in the V-1-S boxes, Code B, showed moderately heavy corrosion in the boxes with the sleeve as well as the box without the sleeve. The cans in these boxes would be considered unmarketable.

The bursting strength of the box after 288 hours in the kiln was 774 lbs. per square inch as compared to 794 lbs. per square inch for the original container.

The cans in the V-2-S boxes, Code C, were starting to corrode after this 288-hour kiln treatment. Very small spots, .01-.02 in. in diameter appeared on the body of the can. The side seam and the seam at the top and bottom closure were moderately corroded. Cans were probably still marketable in this condition.

The bursting strength of the box was 499 lbs. per square inch in comparison with 533 lbs. per square inch for the original container.

The cans in the V-3-S box, Code D, sealed and placed in

TABLE II.—EXTENT OF CORROSION OF TIN CANS IN V-BOXES FOLLOWING KILN TREATMENT

Time of Test in Kiln	Type of Closure	Code A V-1-S	Code B V-1-S	Code C V-2-S	Code D V-3-S
72 Hrs.	With sleeve	...	2-3	0	1
	Without sleeve	2-3	2	0	1
	Conditioned to 13 per cent moisture	...	2	0	...
	Sealed with Solseal tape	2	...	...	1
144 Hrs.	With sleeve	4	4	0	3-4
	Without sleeve	3-4	4	0	3
	Conditioned to 13 per cent moisture	...	...	...	3
	Sealed with Solseal tape	3-4	...	...	...
216 Hrs.	With sleeve	4	4	1	4
	Without sleeve	4	4	1	4
	Conditioned to 13 per cent moisture	...	4	1	...
	Sealed with Solseal tape	3-4	3-4	0	3-4
288 Hrs.	With sleeve	4	4	2-3	4
	Without sleeve	4	4	2-3	3
	Conditioned to 13 per cent moisture	...	...	...	...
	Sealed with Solseal tape	4	...	...	3-4
360 Hrs.	With sleeve	4	4	3-4	3-4
	Without sleeve	4	4	3	3-4
	Conditioned to 13 per cent moisture	...	4	3	...
	Sealed with Solseal tape	4	4	2-3	4

Legend: 0 No corrosion. 1 No visible corrosion, rough to touch.
2 Light corrosion. 3 Moderate corrosion. 4 Unmarketable.

the kiln with the sleeve showed moderately heavy corrosion on the body and heavy corrosion on the seams. The cans in the box placed in the kiln without the sleeve showed moderate corrosion on the body and moderately heavy corrosion on the seams. These cans would probably be considered unmarketable. The cans in the box completely sealed with Solseal waterproof tape showed moderately heavy corrosion and would probably be considered unmarketable. No condensation was observed in this box.

The average bursting strength of these boxes was 473 lbs. per square inch in comparison with 489 lbs. per square inch for the original container.

Results of 360-hour kiln treatment

After this period of treatment all boxes were removed from the kiln and the cans examined for corrosion. The cans in the V-1-S boxes, sealed and with sleeves, Code A, were heavily corroded. This condition applied to the cans manufactured by the Continental Can Co. as well as to those manufactured by the American Can Co. The Continental cans were more heavily corroded on the tops than the American cans. All of these cans would be considered to be unmarketable.

The cans in the boxes sealed, but without the sleeve, as well as the boxes completely sealed with the Solseal waterproof tape, were also heavily corroded and would be considered unmarketable. No condensation was observed in the latter boxes.

The average bursting strength of the box after 360 hours in the kiln was 648 lbs. per square inch as compared to 679 lbs. for the original container.

The cans in the V-1-S boxes, Code B, were heavily corroded and would be considered unmarketable. This same condition applied to the cans in the boxes sealed and with the sleeve, those in boxes sealed and without the sleeve, those in boxes conditioned to 13 per cent moisture before sealing and to those completely sealed with Solseal waterproof tape. No condensation was observed in the latter box. The cans from the American Can Co. were corroded as badly as those from the Continental Can Co.

The average bursting strength of the boxes was 763 lbs. per square inch in comparison with 794 pounds per square inch for the original container.

The cans in the V-2-S boxes, Code C, exhibited slight to moderately heavy corrosion and while they probably would be unmarketable, they were nevertheless in much better condition than the cans in any of the other boxes. This condition applied as well to the cans in the boxes sealed and with the sleeve, those in the boxes sealed and without the sleeve, those in the boxes conditioned to 13 per cent moisture before sealing and to those in the box completely sealed with Solseal waterproof tape. No condensation was found in the latter box.

The average bursting strength of these boxes was 495 lbs. per square inch as compared to 533 lbs. per square inch for the original containers.

The cans in the V-3-S boxes, Code D, exhibited moderately heavy corrosion and would probably be considered unmarketable. They were, however, in better condition than the cans in the V-1 boxes.

This unmarketable condition of the cans applied to the boxes sealed and with the sleeve, those in the boxes sealed and without the sleeve and to those in the box conditioned to 13 per cent moisture before sealing. The cans in the box completely sealed with Solseal waterproof tape were very heavily corroded. No condensate was observed in these boxes.

The average bursting strength of the boxes was 489 lbs. per square inch which was identical with the strength value of the original boxes.

Miscellaneous tests

Several additional tests were performed in the course of this investigation. One Code C V-2-S box was completely covered with adhesive on the inside by painting with Du Pont weather-proof No. 77, filled with cans and exposed in the kiln treatment for 144 hours. These cans were entirely free from corrosion. Several cans were wrapped in a .025 laminated kraft sheet. This board is made by laminating two plies of .0125 kraft paper with urea-formaldehyde resin and starch. These cans were practically free from corrosion. Several individual unboxed cans were also placed in the kiln. These cans were slightly corroded. One of these cans was placed on a V-3 box during the kiln treatment and the bottom of this can was heavily corroded.

Two cans, one from the American Can Co. and one from the Continental Can Co., were placed in distilled water at 73 deg. F. for 24 hours. Both cans showed considerable corrosion around all seams on completion of this treatment.

Conclusions

This investigation has been productive of results from which the following general conclusions may be drawn:

1. The complete kiln treatment was sufficiently severe in all cases to cause the cans in the several types of containers to corrode to a considerable degree. There was, however, a considerable variation in the time required for the cans in the various containers to exhibit corrosion under identical treatment. The cans in the V-2-S boxes, Code C, withstood the treatment for 216 hours before a very slight corrosion was evident and at the end of 360 hours of treatment the majority of these cans showed only moderate corrosion. This container was, by far, the best for inhibiting corrosion of the tin cans. The containers themselves withstood the treatment without appreciable deterioration.

2. The cans in the V-3-S boxes, Code D, withstood heavy corrosion for 216 hours. However, light corrosion was noticeable on these cans at the end of 72 hours and moderate corrosion was observed at the end of 144 hours. These containers also withstood the treatment without appreciable deterioration. The composition of the V-3-S boxes while not as satisfactory as the V-2-S box for inhibiting corrosion was slightly superior to the V-1-S box.

3. The cans in the V-1-S boxes, Code A, and those in the V-1-S boxes, Code B, exhibited moderate corrosion at the end of 72 hours and heavy corrosion at the end of 144 hours and were unmarketable. Additional treatment increased the amount of corrosion. The composition of the V-1-S boxes, Code B and Code A, seemed to promote more rapid corrosion of the cans than the V-3-S box. It is possible that the presence of the asphalt lamination in the V-2-S box prevented the formation of compounds which accelerated the corrosion of the cans.

4. The cans in boxes sealed and fitted with sleeves corroded more rapidly than the cans in the boxes sealed but without the sleeves.

5. The cans in the boxes which were conditioned to 13 per cent moisture before filling with cans and sealing did not corrode any more rapidly than those sealed in the containers without previous conditioning.

6. The cans in the boxes which were completely sealed with Solseal waterproof tape resisted corrosion longer than the cans in the boxes sealed in the (Continued on page 156)

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Turpentine as testing medium

QUESTION: In comparing materials for greaseproofness we have been using turpentine as the testing medium. Is there any correlation between these turpentine values (in seconds) and the greaseproofness using oils such as chicken fat, cottonseed oil, lard, etc.?

ANSWER: Unfortunately there is no correlation between the turpentine test for greaseproofness and tests using natural oils and greases on a wide variety of materials.

The turpentine test provides a useful and reliable index of greaseproofness for glassines and parchments. It is also a quick test suited for the production control of those papers.

However, it is not a reliable test for materials which obtain their greaseproofness by means of coatings, lacquers and similar treatments. Turpentine may act as a partial solvent for some coatings and indicate a low level of greaseproofness. However, the natural oils may not possess this solvent power for the coating and the coated material would actually prevent their penetration.

A test made with the specific oil or fat would be the best means of evaluating the greaseproofness of many different kinds of materials.

Puckering of films in heat sealing

QUESTION: In heat sealing many different kinds of plastic films we notice that some kinds and some types of other films will pucker and creep near the sealed area. Also that the sealed area has shrunk in length compared with the original film. Is this due to our faulty heat sealing and if so, how can it be overcome?

ANSWER: Many plastic films can be highly stretched either cold or in a warm atmosphere. This can occur in the original manufacturing process or in subsequent treatments and processing. Depending upon the composition of the film, the storage temperatures and whether or not the film is firmly held in position, some or all of this stress may be relieved before the film is used.

If the film you received still carries these stresses it will heat seal as you describe. This occurs because the molecules cannot move or flow to an "at ease" position at room temperature, but can adjust themselves more rapidly as the temperature increases. The heat of sealing causing this molecular readjustment and the dimensional change is the inevitable result.

How to Prevent Sifting

QUESTION: Our company packages a finely powdered tea in a cellophane wrapped carton which has a glued side seam liner with folded closure. We have many complaints of sifting with this package which results in an undesirable appearance because of the tea particles between the carton and the cellophane wrapper. How can we avoid this difficulty?

ANSWER: The best solution to your problem would be to use a heat-sealed liner for your tea carton because in this way you would get a more positive closure than with aqueous adhesives or with folded closures. However, since you probably only have this type of lining equipment on hand, one possible answer would be to make the carton a little shorter so that you compress the liner and this, with perhaps another turn of the top fold, might help reduce the amount of sifting. If the sifting is not too severe, but is noticeable because of the dark color of the particles under the cellophane, it might be possible for you to use a dark-colored band around the bottom of your carton and this would serve to prevent the tea particles being seen after they had sifted through and fallen along the bottom of the package. This change in design plus the tightening of the inner liner might reduce this problem to the point where it would no longer be a serious complaint.

Accelerated tests for product with fat content

QUESTION: How can I test under accelerated conditions packages carrying a product which has approximately 20 per cent fat of a melting point of 85 deg. F?

ANSWER: Finished packages either machine made or their equivalent in hand-made samples can be exposed to an atmosphere of 100 deg. F. at normal or low humidities (60 per cent or less). Each package should be laid on tissue or filter paper and several, say three, should be exposed in each of the various positions—that is, three sitting on the filter paper in their normal position, three with the closure on the bottom, three wide face down and three narrow face down.

In case it is possible to remove the inner liner, the filled liner should be exposed in this same way in groups of three. The temperature of 100 deg. F. is sufficiently above the melting point of the fat to cause liquefaction and seepage through either the structure or its seals and closure. The usual index of failure is the time required to observe oil staining on the carton. With (Continued on page 158)



ANNUAL MEETING *Packaging Institute*

"Meeting wartime restrictions"

Sober stocktaking at the conclusion of a second year of war marked the annual meeting of the Packaging Institute November 4 and 5 in the Hotel New Yorker, New York City.

It was a businesslike conference, keyed to the theme of "Meeting Wartime Restrictions." In four general institute sessions, members attending in record strength heard and discussed reports on Government restrictions, the glass packaging manual, new adhesives, package and material testing standards, availability of materials, and the problems of contract termination, renegotiation and alien patents. Some of the sessions were round tables and panel discussions in which questions and answers were given straight from the shoulder.

Suppliers of materials and containers generally held out little hope of any easing of restrictions in the immediate future, but on the other hand most of them felt that present positions could be maintained for the next three to six months. An interesting and important fact brought out was that the manufacturers of packages are themselves threatened by the shortage of shipping containers. Representatives of both the glass industry and the collapsible tube industry agreed that lack of boxes in which to ship their products was a greater danger than either manpower or material supply, important as these latter problems might be.

The necessity for another intensive nationwide drive to bring in wastepaper was agreed upon and members were urged to lend their utmost support to such a drive, nationally

and locally in order to build up fast dwindling reserves.

Registrations at the convention totaled 557 and it was disclosed that membership in the Institute has nearly doubled in the last year.

One of the most important sessions was that in which Charles A. Southwick, Jr., F. S. Leinbach and W. H. Graebner presented their preliminary outline for a manual of package testing and opened it up to suggestions from the floor.

Members dropped their "strictly business" attitude only on Thursday evening for a reception and informal dinner at which they heard a gripping, first-hand report on the war by Charles Collingwood, youthful CBS foreign correspondent and award winner. Collingwood was critical of the State Department's handling of the occupied nations, but he took occasion to deny any mishandling of Lend-Lease and warmly praised the British for the real material aid they are giving this country.

The Institute re-elected all its officers for another year—Joel Y. Lund, Lambert Pharmacal Co., president; A. Vernon Shannon, Westfield River Paper Co., and Wallace D. Kimball, Standard-Knapp Corp., vice-presidents.

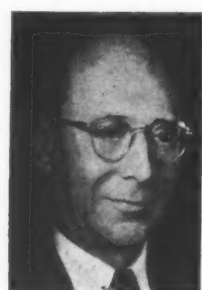
The semi-annual meeting of the Institute was set for Wednesday evening, March 29, 1944, at the Palmer House, Chicago.

The three divisions of the Institute—Machinery, Production and Supplies—held their annual meetings at off-the-record luncheon sessions Thursday and chose officers as follows:

The Package Machinery Manufacturers Institute elected George A. Mohlman, president of the Package Machinery Co., as its president and named as vice-presidents H. Kirke Becker (re-elected), president of the Peters Machinery Co., and Frank B. Fairbanks, president of the Horix Manufacturing Co. Chosen as directors were Mr. Mohlman, Mr. Fairbanks and H. Lyle Greene, vice-president of the J. L. Ferguson Co.

Charles A. Southwick, Jr., technical editor of MODERN PACKAGING and technical director of the Shellmar Products Co., will continue as chairman of the Production Division. Two new directors elected in this division are Gustav Winckelmann, vice-president of Frankfort Distilleries, Inc., and T. R. Baxter, manager of packaging and packaging development department, Standard Brands, Inc.

Dr. H. A. Barnby, Owens-Illinois Glass Co., was elected chairman of the Suppliers' Division, succeeding Hal W. Johnston, Stecher-Traung Lithograph Corp. Walter D. Lynch, vice-president of the National Folding Box Co., was elected a new director and Mr. Shannon was re-elected.



W. O. Brewer

Pharmaceutical manufacturers had a separate informal luncheon meeting on Friday which developed into an interesting interchange of ideas on the particular wartime packaging problems besetting this field. This meeting was under the chairmanship of W. O. Brewer, Calco Chemical Division, American Cyanamid Co.

On Friday also, the machinery manufacturers' section had a second off-the-record meeting to discuss their own problems.

A digest of the complete proceedings at the four regular sessions of the Institute follows:



THURSDAY MORNING, November 4

Presiding: JOEL Y. LUND, vice-president, Lambert Pharmacal Co., St. Louis, Mo., and president, Packaging Institute.

PRESIDENT LUND: It is quite a source of gratification to us who have been interested in the Institute to find this increasing interest in the sort of things that we believe people like to know about and want to find out about. This is the largest meeting we have ever had. Our membership is increasing also. A 50 per cent increase over last year.

Conditions this year are a lot different from a year ago. Last year we were just beginning to feel the impact of the wartime restrictions and shortages. At that time there was a lot of conversation about things that were going to happen, but we were just beginning to wonder whether the whole thing would be as bad as we thought. Now we have found out that things were not only as bad, but generally worse.

Last year we were still living on our fat, so to speak. Inventories had been gradually going down and were slowly being exhausted, but there were still things left. As the war progressed, new requirements of the armed forces brought about shortages in first one thing and then another, and there was a frantic search on the part of everyone for some sort of a substitute to take the place of things they knew were going to be short.

Not only that, but even if they could find those materials,

there had to be new methods of fabrication, new methods of adapting those materials for use. We just did not know where we were going, but we thought we would be able to do something about the matter.

At that time also the thought was that while most of the raw materials might eventually be short, at least paper would be one thing of which there would be a sufficient supply. There was a lot of discussion last year about paper and how it could be used to take the place of metal and glass, and some other things. Now it appears that paper is also short.

Our manpower situation was just beginning to get bad last year. We had started to train new operators and we began to realize that we were going to have difficulty even if the draft had not made the inroads that it has this year on our personnel. I believe it is quite a tribute to the work that has been done by people such as you who are here, in the engineering and development of packages, that there have been so few failures, comparatively speaking. Of all of the new things that have come on the market most of them have worked out pretty well. That has been due to a realistic and practical approach, and a knowledge of the sort of thing that people had to do, and what qualifications the package had to have, as well as a desire and willingness not to just take anything because it might be better than nothing.

This year, of course, conditions are different. The real scarcity has come upon us. In many cases because of increased productivity and because of the limitation orders that we have had on metals and particularly the so-called liner metals, the supply is much better and they are even cutting back on some of the production programs because there is more available material than they want.

At the same time, the pendulum is swinging the other way and paper (which I imagine we will hear more about in this meeting) has become quite scarce. Glass is also in the same category. We are going to have to find some ways to move back into these other materials or else find some ways to economize. We still have the ever-present limitation orders and probably will have.

It certainly is true that we have to have limitation orders. It seems also true that we ought to be a little more practical in our aspect on these things. I think in writing these orders, there has been too much of that effort to try to avoid loopholes, so that somebody cannot outsmart the order. That has had the effect, I believe, in some cases of making the orders not as effective as they might otherwise have been.

For example, take the box order, L-317, just issued. There are two or three things to my mind that make the situation worse rather than better. If a man has actually been out trying to conserve paper, the base period, the way it is set up, works a hardship on him. If he has cut out small sizes and is shipping only in larger shipping containers, the base period being comparatively recent does not provide for that thing. So that the man who has not tried to conserve is in a relatively better position and can now cut down on shipping in small sizes. Other men, who tried to conserve are out of luck.

In some ways it also encourages waste. Take, again, the small-size situation. Because restrictions have been put on the basis of use, rather than allowing for inventories (and I don't think there are very many large box inventories anyway), the thing is set up in such a way that you cannot use up any boxes that you might have had that are not economical to use. It is a lot better in terms of shipping out materials just to take those boxes where you use, let us say, 10 sq. ft. per unit of volume in the shipping, instead of using another one that might use only perhaps 8 sq. ft. Nobody is going to use those boxes out of his inventory but will instead buy the new

boxes that give him the most economical use of the paper. Meantime, these others will sit around until the end of the war unless there is some way of offsetting it. It seems to me that should be taken into consideration.

I think another thing they did on that was this: Because they did not want people to change from jute to kraft and get the lighter weight, they put the restriction on footage as well as on weight. It seems to me they could have allowed a person to redesign his boxes if he continued to use the same kind of material. In other words, you do not want, certainly, to take everybody from jute into kraft, but on the other hand if a man can redesign a kraft box to make a box that is a really good shipper and at the same time save on board, he should be allowed to do it and get credit for it on his quota. Of course, they say a person ought not to redesign his boxes because they are going to get them so light they will not carry. I don't think that is necessarily true, because, after all, our primary interest (which is the reason we are here today) is in good packaging and to get our materials to destination in proper condition. If boxes are not of the proper weight and properly designed, they will not get the materials delivered in the proper way and we would all be very foolish to redesign a package that would give a bad result.



J. Y. Lund

The function of the Institute is to look forward on these matters. It is a nice thing to sit around and have a bull session on what is going on and what has happened. But, really, the Institute can only be of value if it helps us look forward, if it helps us to judge the things that are going on, in the light of the future, so that we can in return adjust our businesses and adjust our problems to meet changed conditions and be ready for them when they come along, rather than wondering what to do about them after they creep up on us.

We ought to know not only what the new materials are that are being developed as a result of the war, but we ought to know how to handle them, how to use them, how to test them in the light of the results that they are to accomplish.

We hear a lot of talk about postwar business. Really, what we are interested in is postwar contracts. What are you going to do with your plant when you do not have any more war business? How are you going to change it back? What are your problems going to be with regard to the termination of contracts, reconversion and that sort of thing? The machinery people are in that right this minute. A lot of them have been making machine tools and special parts, and a good many of them are having contracts terminated. They have problems of getting back into their own business. It will be helpful to all of us if we can see how they are working on these problems and use that as a guide for our further thinking.

Of course, no work or study that is handled by any meeting can be well done unless it is based upon a proper foundation. In this case the foundation should be a knowledge of the general overall situation as far as packaging and packaging materials are concerned and the packaging problems that are involved. I don't think there is anybody in the country who is better fitted to talk about this thing than is Charlie Sheldon. Charlie headed up the Container Division in Washington for a year, as you know, and he did a grand job. Everybody realizes that. He has kept in touch with the situation down in Washington since then and is, I think, in a better position to tell us what we want to know, perhaps not what we would like to know, but at least what the facts are, as a basis for the future discussions we are going to have here.

What Is Today's Packaging Picture?—CHARLES L. SHELDON, purchasing agent, Hood Rubber Co. (a division of B. F. Goodrich Rubber Co.), Watertown, Mass., and former chief of the Containers Branch, WPB.

About a year and a half ago I stood here (or perhaps it was some other hotel) and said that you could safely change to paper and you would have no difficulties at all—just get into paper and your troubles would be over. I think I also said that you might get into wood at that time. Things have changed—and changed very rapidly.

I wish I could stand here and tell you that your packaging supplies are going to be plentiful but in all honesty I can't do so.

The fact is all packaging materials are critical and I am sure that this statement is not news to you. No matter what you use—paper, glass, wood or steel containers—the problem of obtaining your supplies is a difficult one, and no doubt, as time goes on, and until the end of the war your difficulties will increase.

The entire field of packaging materials is controlled by Government orders and sometimes we wonder if all the controls are necessary. To my way of thinking they are. The reasons for these controls are easily explained. Steel and tin are needed for war materials. Therefore, it was prohibited to use steel or tin for any commodity that could be packed in other materials. Then, many commodities went into glass containers. The glass industry was soon loaded to capacity and to increase production, the WPB issued order L-103. Many users of distinctive bottles were forced to use a standardized design. But what is wrong with more than one manufacturer using the same kind of a bottle? Especially is this true when the overall packaging picture is helped. While L-103 did help increase production, a survey showed demand exceeding production by approximately 25 per cent. L-103B was issued placing quota restrictions on certain products packed in glass containers. This order made available more containers for the packing of food. I am certain no one is going to object to having more food. The allocation order on fibre drums gives the essential products that need this type of package first call on the available supply. The folding and setup box restrictive order is a step towards conserving board and also prevents some wasteful practices.

Of course, we all know about P-140 (the container rating order) and by the way, I understand that there is a new order to be issued shortly which will give users of boxes a new rating pattern.

L-317, the latest restrictive order on corrugated and fibre containers, is really a severe one. WPB states that a part of the impact of the limitations imposed can be absorbed easily if users will resort to utilizing used containers or other types of packing. It looks as if the second-hand case market is in for a boom. You can't turn to wood because a companion order (L-232) was issued last week restricting the same products and many others from the use of it. It has been stated by WPB that there is an overall shortage of 2,500,000 feet of lumber for 1943. Forty per cent of all lumber being produced is used in crates and boxes.

Early realization by the WPB that there was the vital need of paperboard—and that without sufficient supplies our war effort would suffer—might have prevented the present situation. The industry should have been rated essential long before it was. Order M-241, limiting production of certain boards, particularly folding and setup boxboards, to 80 per cent and container board to 100 per cent, should never have been issued. Later this order was revoked but the damage

had been done and now we are trying to repair it. As a matter of fact, sections of WPB were of the opinion that we could get along on much less board than we are now manufacturing, even though many products formerly packed in tin and steel were being put in paper boxes, fibre drums and cans, and demands from our armed services had increased tremendously. There was a feeling that a great many products could be



C. L. Sheldon

eliminated from cartons and packed in bulk. If this line of thinking had been followed, you can well imagine the confusion and hardship it would have caused manufacturers and retailers alike. I will admit that some articles now in cartons could be safely and easily handled without them. Better sense finally prevailed and instead of elimination of cartons from entire lines, order L-239 was issued to do away with extravagant and wasteful practices. No one should object to this program. Possibly, a number of recommendations made by WPB will

continue to be followed after the war.

The appointment of a coordinator of pulp and paper is certainly a step in the right direction and I hope it proves that the thinking prevailing in some quarters of WPB has changed. Instead of all containers being handled by one division of the WPB a recent change has been made so that fibre and corrugated shipping containers, as well as folding and setup boxes are to be in a new division and the balance of the containers remain in the old Containers Division. It is difficult for me to understand why this change was made and if the reason is that the WPB wanted products made of paper in one division, why didn't they put fibre drums, paper cans, drinking cups and paper bags in the same division with fibre containers? As the situation now stands, if you are a user of, let's say, fibre cans, you see one division and then go to another for your paper shipping containers. If you use wooden boxes and also paper boxes you will have to contact two divisions. If an order is written on one type of container, it always affects other kinds and many times it is necessary to write another order so that the balance may be maintained. For example, if you write an order prohibiting the use of paper shipping containers for certain materials, you should prohibit the same materials from the use of wood, as the wooden box situation is extremely critical. Every time an order is written, the over-all container situation must be reviewed and it seems to me that this could best be done if all containers were under the jurisdiction of one man.

We all realize that today's situation is critical and that is why the WPB started its re-use campaign, and we should further this program. Many companies are getting their containers back and re-using them. Others have cleaned out their stock of obsolete containers and some have redesigned their containers to save material; also, by increasing their packing unit they have made substantial savings. Let us cut out all fluff and frills and overpackaging to conserve the supply of fibre and lumber and make available these materials for other essential uses.

In my own plant we have changed over to 92 per cent war work. We have had thousands of cases on hand that we formerly used for packaging civilian products that we make. They were just lying there, drying out, and would be no good. So I got rid of them in the last couple of months—some 85,000

of them. I think there are probably a great many other cases like that throughout the country.

We are hearing a great deal about postwar planning, but in business today we have so many troubles it is natural for us to concentrate on our daily problems. However, the day is coming when Government restrictions will be removed and we should have some ideas about what we are going to do relative to our packaging. Now is the time for action. Now is the time to do your planning.

In the October issue of MODERN PACKAGING there is an editorial by C. W. Browne entitled, "Plan Now for Reconversion." Mr. Browne outlines eight points and I am going to take the liberty to read them to you:

1. What basic changes have taken place, or will take place, in my products that I want to retain or that I want to re-convert? How will those changes affect my packages?
2. What basic changes will appear in consumer desires that will have an effect on my packages?
3. What changes must I know about in the merchandising setup and what changes in my packages must be made in adaptation to them?
4. What packaging materials have I substituted in place of scarce materials that I may want to retain or drop, depending on (a) future availability; (b) performance; (c) economy; (d) convenience; (e) competition?
5. Will the postwar export business, of which I expect to get my share, require providing new types of inner and outer containers?
6. What new packaging machinery will be available and what reconversions of present equipment should I plan?
7. Why shouldn't I plan my re-designs NOW and be fully ready for re-conversion when the time comes?
8. Have I someone in my organization on whom I can rely to obtain accurate answers to these questions and prepare a program to fit the situation?

Mr. Browne further pointed out the answers will not be found in any book—they must come out of a searching analysis of the individual product or business and that is a problem for an executive. This plan has been so well outlined by Mr. Browne that there isn't anything I can add except this: "What new packaging materials and methods have been developed that I can use?" I suggest that you read the entire editorial.



In 1941 the packaging industry total dollar-volume of business was estimated at \$2,678,000,000, but in 1943 it is expected that they will do \$3,440,000,000. Some of this increase is due to higher prices but a large part is due to increased production.

Here are some production increases: In 1941 fibre drum manufacturers produced approximately 5,000,000, and in 1943 it is expected that 25,000,000 will be made.

Steel drum use has been restricted by the WPB, but approximately 10,000,000 more drums will be made in 1943 than were made in 1941. Of course, this is due to the demands of our armed services—Multiwall bag producers used 270,000,000 tons in 1941. In 1943 they will use approximately 315,000,000 tons and expect to use 375,000,000 tons

in 1944. The glass industry produced about 71,000,000 gross in 1941, but this year will make between 92,000,000 to 95,000,000, a large part of this increase being in wide-mouth containers. It has been estimated that twice the lumber used for boxes and crates in 1941 will be used during the year 1943.

The packaging industry is one of our most progressive. Although regulated by many Government orders and handicapped from lack of raw materials, manpower and new equipment, it has done a remarkable job in increasing production and developing new types of containers not only to take the place of those prohibited, but also to carry supplies to our armed forces no matter where they are now or will be in the future. Truly it can be said containers have gone to war.

Swamped with orders, the container manufacturers—and this goes for all of them—have somehow managed to keep industry supplied. They certainly have earned our respect and good will and have a right to be proud of their achievements.

In that bright tomorrow when peace returns, all of us will benefit from the new materials, processes and packaging methods that they have developed.

MR. LANDIS, *Atlantic Refining Co., Philadelphia*: Mr. Sheldon suggests that old cartons that are on hand and are drying out should be given up to help the fibreboard situation. Is there any stipulation that if you do that you could get credit for that amount of stuff and buy some new material in like quantities?

MR. SHELDON: The order does not give you credit for doing that, not at all. In the cases where you have to get down to the inventory restrictions in that order, it might help in that way, on the other containers you are using. But as far as increasing your quota is concerned, or helping you to get containers, the answer is "no."

PRESIDENT LUND: I have a question of my own, Charlie, as suggested by this discussion. What is a secondhand container?

MR. SHELDON: I talked to Tom Tomiska the other day in Boston and asked Tom that question. He says it is a container that has been used. I guess that is your answer. That it is a container that has been used once for shipment. A box that has never been used is not a used container, even though it is a secondhand box.

MR. HOLMES, *Inland Container Corp.*: If you have boxes that were purchased with an AA-3 Priority that are now surplus under the inventory clause for lack of additional requirements, can you dispose of those to someone without a priority?

MR. SHELDON: Yes, I would say so. You can buy containers, if you can get them, without priority ratings. You can place orders and if the manufacturer of containers can make that order (if he has a surplus capacity) he would be able to ship the containers to you. You have to be careful about the "V" in "boxes" though. That order very clearly states that "V" boxes must be used for packaging war materials only.

MR. FOOTE, *Wilson & Co.*: I would like to know if the fibre or corrugated carton industry as an industry is living up to the priority rating pattern in furnishing boxes on a AA-1 rating in preference to all other ratings, except the AAA rating?

MR. SHELDON: I think the WPB would like to know the answer to that one also. I don't think all of them are. I do think in the main, the large majority of corrugated and fibre box manufacturers are living up to it.

MR. BAUGHMAN, *Toledo Scale Co.*: I am very much opposed to the use of the words "secondhand" containers, especially because of the reaction of the carriers, where restrictions are about to be issued on secondhand containers. I am very heartily in favor of the term "used" containers, instead of "secondhand" containers. I think it would have a better psychological effect on the claims men of the railroads.



Automatic Glass Packaging.—H. A. BARNBY, *director, Packaging Research Division, Owens-Illinois Glass Co., Toledo, O.*

If one were to sit down with ten average production men to discuss "Automatic Glass Packaging" it is probable that each would have in mind a different picture of what the subject denotes. The mental image created in the ten individuals would vary probably all the way from the bottling of catsup at 300 containers per minute to the consideration of a more rapid means for inserting cut plugs in the neck of tablet bottles.

For any given container or product, automatic glass packaging to the writer means the satisfactory transformation of empty bottles, caps, labels, etc., as received to finished goods in the warehouse with the minimum expenditure of time, labor and dollars invested.

So much for the definition. I'll venture the guess that our ten production men would come a lot nearer agreeing on this definition than they would on the best means for attaining the "minimum expenditure of time, labor and dollars invested" for every thousand cases entering the warehouse. Certainly anyone who makes the rounds of a few plants carrying out the same general operations will be impressed with the non-uniformity of practices, physical setup and overall efficiency.

More important than trying to explain why such non-standard methods in glass packaging practice exists has been the urge on the part of the makers and users of glass containers to do something about it. This urge gave rise to a meeting called by the Glass Container Assn. some three years ago at the Astor Hotel at which container manufacturers, production managers and equipment manufacturers each were represented.

Out of this meeting came the idea of preparing a Glass Packaging Manual, which as then conceived, would be a sort of question and answer guide book on common glass users questions or problems. The assignment for developing this booklet went to the Glass Container Assn., but through pressure of more urgent things, only a beginning was made in the write-up.

At a Packaging Institute directors' meeting last spring, it was voted to revive and complete this manual idea and Carl Lambelet, Charlie Southwick and the writer were given the job. The Glass Container Assn. has kindly consented to this plan and is agreeable to the publication being issued as a Packaging Institute job.

Rather than follow out the subject matter on the manner of presentation exactly as begun, the committee was impressed with the real worth of this book if more completely done. Accordingly, it was decided to take whatever additional time was required to expand and illustrate the contents fully. The manual should be ready for the printer by the first of the year.

The Glass Packaging Manual is made up of three sections

as shown by the topics listed in the following outline:

1. *The Glass Package*
 - A. Container
 1. Determination of shape.
 - a. Preliminary consideration.
 - b. Determination of design particulars.
 - c. Design as influenced by glass manufacturing technique.
 - d. Design as influenced by glass handling equipment.
 2. Glass container nomenclature.
 3. Dimension tolerances and inspection.
 4. Container standardization.
 - B. Closures and finishes.
 1. Closures.
 2. The Glass Container Assn.
 3. Standardized finishes.
 - C. Label and labeling.
 - D. Shipping case.
2. *Packaging Operations*
(A graphic summary of principles employed)
 - A. Conveying.
 - B. Cleaning.
 - C. Filling.
 - D. Capping.
 - E. Labeling (6 principles of labeling).
 - F. Casing.
3. *Packaging Practice*
(Questions and answers, including glossary)



H. A. Barnby

If this Manual provides the means through which those who package in glass containers become better informed on the fundamentals of containers and their successful and efficient use, it has well served its purpose.

This still will not lessen, however, the responsibility of those who supply the container user to see that he has the full benefit of their experience and counsel to the betterment of his operation.

(Mr. Barnby then presented slides to illustrate the Manual and a technicolor film on the subject of glass packaging.)

Not everyone has had an opportunity to keep posted on the progress that has been made in recent years on automatic and rapid glass packaging, he said. For that reason, it seemed advisable to take you on a 25 minute tour by technicolor through some representative food packing operations.

Food plants were chosen because they were largely seasonal operations, which means they cannot often justify the amount or refinement that could be justified for a year round item. Likewise, they are dependent mostly on green help and finally in the packaging and sterilizing of food, the glass container is subjected to more severe treatment than in some other glass packaging jobs.

During the showing of this film, you would do well to keep in mind the questions that follow. The answers should be found in what you see.

1. Is there any production advantage to using round containers as compared with other shapes?
2. Is it possible to convert certain can conveying, filling and labeling equipment so that it will handle glass jars of similar size opening?
3. Can glass jars or bottles be automatically cased?
4. Has the adoption of standardized round containers

contributed sizably to the automatic handling of same?

5. Would you not say that an automatic line for packing and sterilizing fruits or vegetables really demonstrates the progress that has been made in glass container handling?

Affirmative answers to these represent a perfect score.



THURSDAY AFTERNOON, November 4

Presiding: CHARLES A. SOUTHWICK, JR., Director of Research and Development, Shellmar Products Co., Mt. Vernon, O., and Technical Editor of MODERN PACKAGING.

Water-Resistant Glues in the New Geography of Packaging.—DR. FRANK C. CAMPINS, *Sales Engineering Department, National Adhesives Division, National Starch Products, Inc., New York.*

In approaching the problem of water-resistant glues, the obvious first thought is, why not hot melts? Hot melts—more especially in the form of asphalt, but certainly to include also the hot pickup gums that are so widely used in can labeling—seem to afford a ready-made solution to the problem of water-resistant adhesives. And yet, fundamentally, most hot melts act as fluids; namely, they have the capacity to flow under a small but continuous force.

When you try to apply that class of adhesive to the flaps even of an ordinary cardboard carton—or, worse yet, to the flaps of a shipping container which would subject the bond to a continuous tension—then that glue will gradually flow, and that joint will yield.

The next type of product which would obviously be fully water-resistant is the non-aqueous or lacquer type of adhesive. But the use of lacquer types of adhesives has the limitation that in most cases the solvents evaporate off too rapidly for satisfactory machine operation, and the adhesives themselves set, after application, too slowly to enable a satisfactory commercial bond to be achieved in the time permissible for machine production.

Further, most lacquer types of adhesives, unless they be made of very high consistency, tend to penetrate excessively into the stock, because the lacquer solvents, unlike water, do not have a capacity for swelling paper fibres, which with aqueous glues prevents excessive penetration of the glue into the stock.

That leaves us, then, with aqueous types of adhesives. Obviously, there is an anomaly in considering the development of a water-resistant bond from an aqueous product.

From a machine manufacturer's standpoint, or from the standpoint of a man utilizing glue, your aqueous product needs to be stable for machine operation.

Because water is keyed to the property of a paper fibre, namely, that your paper fibre has the ability to absorb water, when you apply an aqueous adhesive to a paper surface you sometimes hear the erroneous statement that glue sets by penetration. Nothing in this world ever set or hardened permanently by the mere act of going into a hole. Neither does glue. When your adhesive is applied to a paper surface, this being a paper fibre, something must happen between the adhesive and the paper fibre to enable that adhesive to body up. And the only "something" that could do that is the ability of that paper fibre to preferentially pull in more water than it pulls glue. In other words, it pulls one ingredient away from the glue at a greater rate than it pulls other in-

gredients out. That way your glue literally concentrates on the surface of the fibre in the absence of evaporation.

The limit of setting is arrived at when your glue sets so fast that actually it will build up on your glue applicator. In other words, as the sheet of paper contacts the glue roll, the glue itself sets partially on the paper and enough of the water ingredient is pulled away to enable the glue to "body up" on the roll. In combating the extremely high tensions encountered in your Victory or weatherproof V-1 reinforced container, as a matter of fact that ceiling has been reached. We have had to work backwards from there.

Another interesting angle on the setting of your aqueous glues is the fact that as you approach the sisal kraft reinforced cases, it is brought out that you have a very rough surface. (Showing Chart) This drawing brings that out. Clearly, the thickness of a glue film that you can apply to a rough surface to apply film continuity is a function of the degree of irregularity of the surfaces. So that the more irregular your surface, as a rule, the thicker the film of glue you are forced to apply. Besides that, you also have the fact that contact is achieved only between humps. Consequently, since your area of contact is greatly reduced, each contact point has a greater responsibility and carries a greater tension, and consequently requires a faster set in the glue so as to be able to hold the flap down, in spite of possibly having only 15 per cent or 20 per cent of the area actually contacted by the compression belt.

How can an aqueous glue develop water resistance? Obviously, something that is dilutable with water, as long as it is in a glass jar, certainly would tend to stay that way. After application to the paper, you must depend on some chemical reaction paralyzing some part of that glue and rendering it insoluble or non-dispersible. In other words, we approach that problem when you seal your board or your paper and you let your glue dry out, and normally you have a reaction taking place sometimes between the small percentages of chemicals present in the board, that makes insoluble the dispersing medium or dispersing agent in the glue, so that that product will not redisperse—in the case where part of the glue that is dispersed is not soluble. In other cases you have chemicals in your paper that deliberately react with water after they are once dried out to give an insoluble substance. Whichever road you follow is largely a matter of what is most available.

Adhesives have come on the market geared only to papers having extremely high chemicals content. Obviously, adhesives of that character would have only a very limited use. A properly designed product should be geared to a paper with a minimum chemicals content, so that it would handle the entire range of papers commercially available.

The postwar period is going to bring with it the release of a great number of freak chemicals and new materials which are today deep, dark secrets, and that, when released, in themselves may well change the entire complexion of packaging.

Let us look at one of the opportunities inherent in the very nature of the warfare that we are conducting. You have in those facts the basis of developing a tremendous export business.

Now, then, if you are going to move stuff long distances, there is the obligation of developing cheap methods of packing—that are economical, that save space and save weight.

You have also a growing industry in the frozen foods group and in the frozen locker industry. Obviously, every time you remove a package from a refrigeration unit, you tend to get a moisture concentration on that package. Consequently, you will need water-resistant glues, and industry is

working very hard to develop the kinds that are needed.

To switch to the fibre can, which has made great progress, partly because of the metal shortage, I want to mention that I think the fibre can is here to stay, in many fields, except possibly where you require high sterilization.

In that field, one use that comes to mind is the oil container. You would need a water-resistant adhesive to enable your container to be stored out in the open without losing its identification. Also, water-resistant adhesives could be used for binding tubes. As a matter of extravaganza, I have also seen materials that were made from paperboard and were impregnated, but that required an impregnation of considerable water-resistant adhesives so that the whole impregnated mass would still hang together.

Tests have been conducted in conjunction with one of the Army branches in the Quartermaster Corps in the development of adequate water-resistant adhesives for picking up and sealing the labels. In conjunction with Stecher-Traung, labels have been developed which are readily available commercially that can be adapted to prolonged submerging in water. So that, if the time is to arrive for glamorizing a package and still making it responsible, field-wise, that time has already come from a laboratory and test production standpoint.

The multi-walled shipping sack, particularly in the chemicals industry, has made tremendous progress in the packaging of practically every type of granular chemical. The reason for that is the versatility of the sack itself, namely, by the use of some type of appropriate liner or protective paper at some part of the manufacture of that bag. It is possible to enable materials such as calcium chloride, sodium nitrate, asphalt or synthetic rubber, to be satisfactorily packaged in that container. The bag people themselves have been very conscious and cautious in not making broadside statements; and they insist—and rightly—on designing a package around each material.

Of interest from the standpoint of water-resistant adhesives, the fertilizer bags represent a great development. They indicate also a possibility. In conjunction with the chemicals industry, in extending the use of the multi-walled shipping container, by using high wet strength outer ply and appropriately insulated inner plies, an appropriate package can be made.

Perhaps few of you realize that these water-resistant aqueous adhesives have to have tremendously wide temperature tolerances. For instance, in the calcium chloride sack, that material is packaged at around 205 deg. F. Some of your asphaltic materials are packaged nearer 350 degrees. So that your water-resistant aqueous adhesive, in addition to having some of what the Government thought was a tremendously wide temperature tolerance of minus 40 to 140 deg. F. (they thought 140 deg. F. was a tremendously high temperature), in the multi-walled shipping sack industry it functionally meets temperature requirements that make 140 degrees look very anaemic.

There is an interesting corollary in a development to meet the requirements of the St. Louis Medical Department of a label for bottles, ampules and medical supplies to withstand 48 hours' submerging in water. I believe it is some type of heat treatment and then there is another submerging test.

Obviously, there is a definite domestic market for water-



F. C. Campins

resistant, bottle-labeling glues. Certainly we have to pay homage to the bar, in this field, because certainly they subject bottles to a lot of wet abuse, and the liquor companies should have their tongues hanging out for a water-resistant labeling adhesive.

Hospital supplies that are liable to be subjected to wetting periodically also need such means of retaining their identity.

In summarizing, I might state that the new geography of packaging is the extension of packaging competitively into fields where that particular type of package never could previously encroach, because of limitations either in the materials or in the adhesives, as far as withstanding conditions of exposure is concerned. Water-resistant adhesives are one arrow in the direction of progress which we ask you to think about and plan with in the future.

CHAIRMAN SOUTHWICK: The next phase of our program will cover the preparation of the manual on packaging materials.

Many of you were present at the Packaging Materials banquet in April, when Mr. Lund appointed me chairman of a committee to undertake the development of standard test methods on packaging and packaging materials. Subsequently, at a directors' meeting, we voted to canvass the Institute membership and a questionnaire was sent out to get from the members of the Institute any information that might help on what obviously was a tremendous undertaking. At the same time the full committee was announced, consisting of F. S. Leinbach, formerly of the War Production Board and now with the Riegel Paper Corp., and W. H. Graebner of the Menasha Products Co. I would like each of them to stand and take a bow.



W. H. Graebner

We have taken the letters that have been received from members and have been working on an outline for standard test procedures, testing methods and certain phases of packaging engineering.

What we propose to do today is to go over this outline and tell you what we are trying to do, and ask for your help and suggestions.

You will notice that we have definitely confined the work of this outline to flexible containers—not all flexible containers but flexible containers of paper, foils and plastic materials, and certain flexible containers in terms of metal tubes. We have eliminated cans and glass jars. As time goes on, we should have test procedures in these other fields, but at the moment we do not. At least, the Institute does not.

We found in outlining this work at the beginning that we had lots of definitions to work up. We found ourselves using words that had either not been defined, or that had been defined so loosely that they meant different things to different people. That is a basic step. And so the next thing we have is a few definitions.

The first definition is the definition of a "package" and reads: "Package—The term 'Package' refers to the complete container of the product normally accepted by the ultimate consumer. The product may or may not be in direct contact with the package."

The next definition is that of "Inner Packaging," and reads: "Inner Packaging—The term 'Inner-Packaging' refers to containers or materials which may be used inside a package for the subdivision of the package or its contents, or for the preservation of unused portions."

The definition of "Packing": "Packing—The term

'Packing' refers to outer container or containers which are used as the shipping means for the package or the product not packaged."

The definition of "Inner-Packaging": "Inner-Packaging—The term 'Inner-Packaging' refers to containers or to materials which enclose or support one or a group of packages, and which are not the primary shipping means."

We found one or two other things that needed definition, and one of these is "Functional Packaging." We suggest as the definition for "Functional Packaging" the following:

"'Functional Packaging' is the designing and making of packages for the accomplishment of specific purposes."

Another definition we found necessary was that of "Equilibrium Humidity," and our suggested definition is: "The 'Equilibrium Humidity' of a product is that humidity level at which the product neither gains nor loses moisture. The value of equilibrium humidity is dependent upon the moisture content of the product."

We found also, in going over this work, that we came up with what may be a new term to most of you, and which we have called "Index of Failure." We have defined it as follows: "Index of Failure is the per cent change by weight (original) of the element which causes failure." It can be either a positive or a negative value. Obviously, if it is a positive value, it has been a gain in weight that has come from external influences. It does not necessarily apply to moisture, but it will apply more to moisture than to any other thing. A negative value of index of failure would result from a moist product losing some of its moisture.

Chapter III covers the "Definition of Functional Packaging." I am going to turn that over to Mr. Graebner.

MR. GRAEBNER: To define "Functional Packaging" we may start as follows: that Functional Packaging is the making of a package that comprises the accomplishment of certain specific purposes. Heretofore, the general concepts of packaging and the specific purposes have embraced largely decorative objectives. However, a critical analysis of functional packaging indicates that there are several factors involved. These phases may be mechanical, chemical or visual.

Perhaps a broad breakdown can first be made in which the first two factors, namely, mechanical and chemical, are thought of as a group that contribute protective qualities to the package as distinct and separate from the visual phase, which provides the attractiveness and eye appeal for the package, and which, in the majority of instances, is a job for the merchandising manager, perhaps, rather than the packaging engineer.

Both classifications are extremely important and it must be remembered that in the final analysis it is the visual function that is the main point of contact between the package itself and the purchaser. However, the mechanical and chemical functions are the prime factor at the point of use. A definition of these functions will serve to clarify this concept.

The mechanical phase comprises those qualities which contribute to the ability of a product to carry through packing and storage and handling without allowing external forces to damage the product, or create conditions whereby it may be damaged by chemical means.

The chemical phase comprises those qualities which allow the package to protect the product from deterioration through:

1. Loss of product constituents by their penetration of the package walls. There we may have moisture, fats or oils.
2. Entry of external detrimental elements. There,

again, we may have moisture or we may have oxygen.

3. Unfavorable reaction between the product and the package itself.

In order that the packaging engineer can build into a package the indicated and chemical functions he must be provided with the necessary tools or methods of analysis and evaluation. Here, again, this can be divided into the three phases of mechanical, chemical and visual functions.

Among those test methods determining mechanical performance, we have methods such as bursting strength, tearing strength, tensile strength, folding endurance, porosity

(or it may be called mechanical permeability): also compression, tumbling and impact tests.

Many of the foregoing methods of evaluation and test are well established and well known to many people. However, it is also necessary to devise testing methods which have not been completely standardized. In some instances, tests are still in the development stage, some of them being very much in the embryonic stages.

Among some of these tests are sealing characteristics, blocking characteristics, pliability characteristics and mechanical stability of packaging materials. A great deal of

OUTLINE FOR MANUAL OF PACKAGE ENGINEERING

(This is the tentative outline as presented to the conference by the committee, subject to further revision.)

- I. Preface
- II. Definitions of Packing, Inner-Packing, Packaging, Inner-Packaging
- III. Definition of Functional Packaging
 - 3 phases of functional packaging
 - A. Mechanical
 - B. Chemical
 - C. Visual
- IV. Discussion of Package Engineering
 - Basis
 - A. Knowledge of Product
 - B. Knowledge of Package Performance
 - C. Knowledge of Terms of Storage and Delivery
- V. Discussion of Economics of Packaging
 - Basis
 - A. Cost of Product
 - B. Cost of the Package
 - C. Value of Returned Merchandise
- VI. Package Material Tests (Evaluation)
 - A. Mechanical
 - PI-MM-1—Bursting Strength
 - PI-MM-2—Tearing Strength
 - PI-MM-3—Tensile Breaking Strength
 - PI-MM-4—Folding Endurance
 - PI-MM-5—Porosity
 - PI-MM-6—Sealing Strength
 - PI-MM-7—Blocking Characteristics
 - PI-MM-8—Pliability
 - B. Chemical
 - PI-MC-1—Water Vapor Permeability at 100° F.
 - PI-MC-2—Water Vapor Permeability at 0° F.
 - PI-MC-3—Air, CO₂, O₂, N₂ (Fixed gases) Permeability
 - PI-MC-4—Organic Vapors (Flavors, Aromas) Permeability
 - PI-MC-5—Water Penetration
 - PI-MC-6—Oil and Grease Penetration
 - PI-MC-7—Static Fold
 - PI-MC-8—Dynamic Fold
 - PI-MC-9—Surface Abrasion
 - PI-MC-10—Aging
 - (a) Temperature
 - (b) Oxidation
 - (c) Light
- VII. Product Tests (Contents of Package)
 - A. Mechanical
 - PI-CM-1—Bulk Density of Contents
 - PI-CM-2—Abrasiveness
 - B. Chemical
 - PI-CC-1—Humidity Equilibria
 - PI-CC-2—Index of Failure (Moisture)
 - PI-CC-3—Index of Failure (Oxygen)
 - PI-CC-4—Free Water
 - PI-CC-5—Free Oil or Grease (*Note*—must be reported by kind)
 - PI-CC-6—Chemical Activity (Acids)
 - PI-CC-7—Chemical Activity (Alkalies)
 - C. Visual
 - PI-MV-1—Opacity
 - PI-MV-2—Transparency
 - PI-MV-3—Brightness and Reflectivity
- VIII. Package Tests
 - A. Mechanical
 - PI-PM-1—Compression
 - PI-PM-2—Tumbling
 - PI-PM-3—Impact
 - B. Chemical
 - PI-PC-1—Moisture Change (CaCl₂)
 - PI-PC-2—Moisture Change (Normal Contents)
 - PI-PC-3—Fixed and/or Organic Gas Change
 - PI-PC-4—Water Penetration
 - PI-PC-5—Oil and Grease Penetration
 - C. Visual
 - PI-PV-1
 - PI-PV-2
 - PI-PV-3

work needs to be done on some of these and, as Mr. Southwick pointed out to you, help is going to be needed.

Among the test procedures to determine chemical performance, the following may be listed:

1. Water-vapor permeability at 100 deg. F. and at 0 deg. F.
2. Permeability to fixed gases in carbon dioxide, oxygen and nitrogen.
3. Organic vapors.
4. Water penetration.

It was pointed out earlier that the visual phase of functional packaging may not be within the scope of the activities designated as package engineering. However, there are procedures of evaluation available that can assist the person charged with the responsibility of creating a visually satisfactory and attractive package. Among these methods are opacity, transparency, brightness or reflectivity.

The next step in the development of a package that is satisfactory from the chemical and mechanical viewpoint or the protective viewpoint is one of package engineering, which is the next subject on your outline.

CHAIRMAN SOUTHWICK: Mr. Leinbach will cover the next chapter, Chapter IV, Package Engineering.



MR. LEINBACH: Package engineering is an applied science. Like any other applied science, its workings are based upon definite numerical working relations. As in any other applied science, the accuracy and usefulness of that information are no better than the clarity and accuracy of the concepts that are used to define the science.



F. S. Leinbach

Mr. Southwick and Mr. Graebner have outlined many of the concepts and they have outlined the ways in which they group themselves. It is the purpose of this section of the manual to outline the kinds of information upon which the application of those concepts, and those groups of concepts, are based, and the general interrelation among them.

Now, the broad pattern of package engineering is simple. It is subdivided, as we all know, in three ways:

First, it calls for a qualitative and a quantitative knowledge of the characteristics of the product in terms of what things affect it, and the rate at which they affect it.

Second, it calls for a quantitative knowledge of materials in terms of how they resist those things that affect the product, and how durable they are.

Third, it calls for an exact definition of the job to be done in terms of storage and delivery; that is, a definition of degree of intensity of those things affecting the commodity, and how long the container must resist them.

Taking these step by step and reviewing very briefly some of the things Mr. Graebner has mentioned and sticking to the subdivisions of the mechanical, chemical and visual phases (by which I think a lot of our thinking on package engineering will be cleared up) it has been mentioned that we should know the bulk density of the product and the abrasiveness of the product, as mechanical characteristics.

We should know, as the chemical characteristics of the

product, its likelihood of deterioration through changes due to internal or external deteriorating elements, such as moisture, oxygen and so forth.

We should know the amount of such change that the product can suffer before becoming unusable or unsalable.

It is also desirable to know the presence of other free agents in the product that tend to damage, deteriorate or detract from the appearance of the package, or the loss of which from the product is otherwise undesirable. Such agents are, free water, free oil or grease, compounds that will react chemically with package materials.

Regarding the packaging materials and the characteristics of package materials and packages, there are a limited number of external deteriorating influences affecting packaged products. These include physical damage, infestation, water, water vapor, oxygen, light, foreign flavors, aromas and temperature. The latter of these is a factor, of course, that cannot be controlled through packaging. These are the natural elements against which the package must guard.

Thus the following factors generally need consideration under the division of mechanical factors. As Mr. Graebner has mentioned, there is the physical durability of the material, qualities such as bursting strength, tearing strength, tensile breaking strength, folding endurance, porosity, sealing strength, resistance to blocking, pliability and mechanical stability of the packaging material itself.

We also need to know something of the durability of the formed package, qualities such as compressive strength, tumbling endurance and strength under impact.

In the chemical phase of the thing, we must know the ability of the material or of the formed package to resist the transition of water vapor at high and low temperatures, transmission of fixed gases or organic vapors, the ability of the package to resist penetration by water, oils and greases.

I think we will all agree that not only must we measure these qualities for packaging materials, but we must measure them for those materials after they have been given some deformation, such as a flat fold or static fold, or some treatment of that sort.

We must also have, of course, a knowledge of the chemical stability of the packaging material, whether it becomes brittle under ultraviolet light, whether it is attacked by oxygen and such factors.

Regarding the visual factors of the packaging materials, as Mr. Graebner has pointed out we have certain tangible things that we now can measure, such as opacity, transparency, brightness and reflectivity. It is hoped, of course, that other things can be defined.

I would like to point out that that is one very good reason for this thing being done by the Institute. At one time the visual end of packaging was considered very important. Later, in the last year or so, we have emphasized what we call the functional end of packaging, which is also the protective end of it and all of us, I think, feel that a balance has to be restored.

Therefore, the members of the Institute are certainly called upon to try to help define other visual qualities that are tangible and measurable.

Regarding the terms of storage and delivery and the things that have to be defined, many of these are factors that will be determined in working out the merchandising of the product. Factors such as the size and capacity—that is to say, the dimensions and the weight of the contents, that merchandising considerations have shown to be advisable for the marketing of the package that is to be put out.

A second factor would be the length and type of storage during wholesale distribution.

A third would be the normal shelf life in retail distribution.

A fourth would be the method of use and/or dispensing the product by the consumer; that is to say, whether the product is used in small portions, so that the remaining portions need continuing protection, thus calling for some sort of efficient re-closure. That, of course, will have a tremendous bearing upon the type of material or construction that is chosen for the package.

Last factors, but certainly not the least important, are the typical temperature and humidity characteristics of areas in which the product will be marketed. The engineering phase enters the picture when this information is used to calculate, before the package is actually made at least the approximate level of functional ability required by that size and that weight of package, of that product, and through the expected time, type and locale of its distribution.

I would like to point out again that package engineering could be said to be the use of these factors in determining beforehand at least the level of functional ability required by that size and weight of package, of that particular product, through the expected time, type and locale of its distribution.

Now take the better-developed aspects of these package materials which tells about moisture-vapor transmission.

Let us assume a product which we will designate as "A." We will say that merchandising studies have shown the advisability of marketing the product in 4-oz., 1-lb. and 5-lb. packages. These merchandising studies also indicate that the expected distribution time is three months. Laboratory reports show that the optimum moisture content—that is, the moisture content at which it is most desirable to pack the product—is 4.8 per cent. The index of failure, which you have heard defined (in other words, the percentage by weight of the deteriorating element of the product) with respect to the moisture of this product is plus 1.3 per cent, meaning that the product will become unsalable or unusable after it has picked up 1.3 per cent of its original weight in moisture.

The bulk density of the product, as differentiated from its true specific gravity, and not taking into account how much it bulks due to physical size, is 3.67 cu. in. per ounce. Taking the amount of cubic contents that we have, and knowing the bulk density, we can certainly calculate the cubic content of the package. Knowing the cubic content, our designers can set the size or the dimensions of the package. Assuming certain dimensions, let us see what happens.

We find that the 4-oz. package will occupy 15 cu. in. The size of the package chosen will have a surface area of 37 sq. in. In the case of the 1-lb. size, that will have a volume of 60 cu. in. and the dimensions chosen will have a surface area of 100 sq. in. The 5-lb. size will have 395 cu. in. and 340 sq. in.

Now, then, in the 4-oz. size you have 15 cu. in. in 37 sq. in. In the 1 lb., you have 60 cu. in. in 100 sq. in. (Notice that the ratio is going down.) In the 5-lb. size, it is 395 cu. in. in 340 sq. in.

We know the weight of the product and the amount of moisture it can be allowed to pick up and the length of time during which the pickup will happen; we know the surface area through which this moisture will come. It certainly is theoretically possible at least to calculate the transmission that can be allowed by that package wall. (I think a lot of you who work in this field will recognize that as a verbal statement of Parson's equation.)

Applying those calculations, the theoretical moisture-vapor transmission required for the 4-oz. package is 4.8 per cent, on the 1-lb. package it is 4.8 per cent, and on the 5-lb. package it is 4.8 per cent. In other words, we have arrived back at the axiom of packaging—that the large package requires less protection against moisture vapor in its walls, for the very simple reason that in a larger package a greater weight is held behind a comparatively or proportionately smaller area.

Now, we have pointed out the relation of volume to area and have pointed out the relation between moisture-vapor transmission in the different weights of package, and we can say that we have arrived at the general level on which we must work for designing packages for these different weights.

I would like also to point out again this matter, which is a fact—that the larger package needs the lesser barrier in its walls. That is of tremendous benefit in many ways. For instance, a bulk case liner for bulk protection in the packing case, or as a bundling medium for groups of packages, may be used for the protection of various sized packages.

The field beyond that point, of course, is well defined in some instances, and less well defined in others. We feel that the thing that has to be done is to get these concepts defined, get these measurements worked out so that they are accurate and reproducible, and carry the thing along until that same sort of thing can be applied right down the line to each one of these qualities—each one of these protective abilities that we have talked about—until the ability of a package is no less unpredictable than is the ability of a bridge.



CHAIRMAN SOUTHWICK: You are probably wondering at this point how we could get so far afield when we started out to write testing methods. This, I think, is part of it. We started out to write the testing methods and we realized that they are only the tools which you use. You must have some knowledge of how to use them. So we changed the name slightly to "A Manual of Package Engineering" and included the test data with certain of these outlines and concepts of how this information can be used, feeling that in this way we are presenting a more complete picture than we had if we simply presented a lot of test methods of standardized procedures for a variation of materials.

With regard to Chapter V, the Economics of Packaging, there are only one or two important points I think we should make.

The first is to clear up a misunderstanding that we do packaging for permanent protection. That certainly is not true in the field of which we are talking. We are handling materials with a certain rate of transmission, and we are handling packages with a certain rate of degradation. There seems to be a misconception that protection should be added to a package until you get no returned goods. That, I feel very strongly, is not clear thinking. So we are not thinking in terms of having you make packages with infinite shelf life. What you actually do in commercial practice is to make your package probably for the average shelf life or turnover of your product. That means that a certain part of the product which has a quicker turnover will be over-protected, in a sense; and probably certain of your products which have a longer turnover will not be as well protected as the average or normal turnover.

However, in most cases we are working with some degrees

of tolerance. A product is not going to degrade certainly and quickly at a given, precise moisture level. There will be some variation in the product. The failure will be usually over a limited range. So that we are thinking of packages to take care of the average shelf life.

Now, then, the cost of the product enters into our thinking at this point, because there is an absolute minimum cost for a given level of protection, and that is a matter of convenience and so forth. It specifies a definite kind of package. There is an absolute minimum cost for a given level of protection. Each kind and type of package has this minimum. In a more expensive product we can use the same protective level with higher cost of materials for convenience and a more dressed-up package, or we can use a more expensive product in terms of a protective package. In the higher value of product, it is usually advisable to run higher packaging cost in terms of absolute value of the packaging cost, to reduce the loss of returned goods.

It seems that packaging cost should be increased as long as the cost of the packaging increase is equal to or less than the reduction in cost of returned or lost merchandise, remembering, of course, the intangibles of borderline failures.

It is also possible (and it is done, in many cases, commercially) to put out a part of your product in a better package. If you find that in the Southern part of the country your turnover is longer and your product deterioration is greater, it is possible to reduce the value of returned goods by packing only that portion of your product which goes into those areas, since this, obviously, will keep down your total packaging cost and cure that specific ill.

We have some other thoughts on the economics of packaging which we shall include later in the final revision of the manual.



That brings us to Chapter VI, Package Material Tests. I think, first, we should explain the code which we have used. By this time you have all suspected that the initials PI mean "Packaging Institute." The next letter can be one of three, either "M," meaning "Material," or "C," meaning "Commodity or Product," and "P" meaning "Package." The fourth letter in this case will be one of three—either M, C or V, meaning "Mechanical," "Chemical" and "Visual." We have developed this in order to quickly recognize these tests in the category in which they belong.

Going on to Subdivisions A—"Mechanical," we have:

- PI-MM-1—Bursting Strength
- PI-MM-2—Tearing Strength
- PI-MM-3—Tensile Breaking Strength
- PI-MM-4—Folding Endurance
- PI-MM-5—Porosity

This whole group of tests could be taken from TAPPI procedures, TAPPI being the Technical Association of the Pulp and Paper Industry. Here is a clear case where we have used the specifications of another association or industry. These are various kinds of mechanical property tests, very well outlined and very well described, with a great deal of definite experience, in the TAPPI test methods. That covers the first five items.

We find, however, in packaging that, besides knowing the mechanical characteristics of materials, we must know something of their combination or construction, put together by

heat sealing and adhesives. Therefore, it becomes necessary to measure such things as sealing strength. I don't know offhand of any test which we can use, which we can lift. We are not averse to lifting from anyone at this point, but I don't know any we can use. We have roughly devised one which is based upon the sealing under a variety of conditions, a specified width of seal, aging that seal at given conditions, and then pulling the seal apart at a given rate of pull of temperature range and humidity. It is probably very elemental. It may leave a lot to be desired. At least it starts us off on a very important function, which is the sealing strength of materials.

Another important characteristic of materials which we run into in packaging is the blocking characteristics. We have outlined a test method for that. We have the most beautiful functional material you ever saw that blocks in high humidity, and if it blocks in storage in your warehouse, if it blocks in summer weather it is not good. You must have a clearly defined means of measuring blocking characteristics.

Question: Have you a definition of "blocking"?

CHAIRMAN SOUTHWICK: That is a very good point. We thought the description of the test would cover that. But it may be a good point to add a definition of blocking at this start.

MR. LEINBACH: "Blocking" is that tendency of heat-sealing materials to seal to themselves in the rolls or stacks of sheets and so forth. Mr. Southwick is going to describe a procedure which will more or less predict under what conditions a heat-sealing material would seal to itself in the course of shipment.

Question: It does not have to be heat-sealing material, does it?

MR. LEINBACH: No, it does not. Thank you for that correction.

CHAIRMAN SOUTHWICK: Now, then, the blocking characteristics of thermoplastic packaging materials we have defined as follows: "Blocking characteristics of thermoplastic packaging materials shall be measured by placing at least six layers of the material between two flat metallic surfaces and maintaining the temperature of the stacks and pressure blocks in ovens held at elevated temperatures for 24 hours. Tests shall be run at $\frac{1}{2}$ lb./sq. in. pressure and/or 1 lb./sq. in. pressure, as well as at 40 per cent + 5 per cent R.H. and/or 90 per cent + 5 per cent R.H.

"Results shall be reported as 'no cling,' 'cling' or 'seal,' regarding tendency of specimens to adhere, and 'no mar,' 'slight mar' or 'mar,' regarding the appearance of the surfaces of the specimens, and the temperature in degrees F. at which these results were observed also shall be reported.

"In the case of materials on which only one side is thermoplastic, results shall be reported after the material is tested both with thermoplastic side against the thermoplastic side, and with the thermoplastic side against the non-thermoplastic side, whether or not the latter condition is to be expected in the package form to be used."

You are concerned with the temperature of blocking at a specified humidity range and rate, so that the unknown factor is temperature.

The next one on the list is "Pliability." We are going to leave that a great big blank. It would be nice if we had some numerical index of pliability. If any of you people know how to do this, and if you have some numbers that could be put down on paper, to indicate a reproducible result, we would be delighted to have it.

That, then, takes care of the items under "A," the last

three of those listed in this division being as follows:

PI-MM-6—Sealing Strength
PI-MM-7—Blocking Characteristics
PI-MM-8—Pliability

The next item is not on the outline, and is known as PI-MM-9—Mechanical Stability.

MR. LEINBACH: I have something here on PI-MM-9, which was written out but did not get into the outline, and these items have been suggested in connection with mechanical stability: Ply separation, distortion, dimensional change, a deterioration of strength, pliability and, under adverse conditions of weather, they should be defined. We intended to put stuffing or abrasion resistance test in that particular provision.

CHAIRMAN SOUTHWICK: We have an abrasion test which is PI-MC-9, and it is intended to include the one on the mechanical side up above.

Question: What about compressive resistance or resilience?

MR. LEINBACH: In answer to that question, I would like to point out that we are talking about material tests at the moment and I believe that would be more likely to fall under a package test. Is that the point that you had in mind?

SAME DELEGATE: I was thinking of cushioning materials, where you are thinking of resistance to compression.

MR. LEINBACH: I see. Let us write that down as a further suggestion. We had not thought of that.

CHAIRMAN SOUTHWICK: That takes us through our first series of mechanical tests of materials.

We then come into the chemical tests on materials, under this Subdivision B—"Chemical Tests on Materials."

MR. WENDLER, *E. I. du Pont de Nemours & Co., Wilmington*: What about the surface characteristics of materials, particularly as they affect machine operations?

MR. LEINBACH: Obviously, there is a tendency to cling to parts of the machine, as many kinds of papers do, or films. I think that is an excellent thing to be measured. Personally, I would not know how to translate that into definable terms at the moment. We will put that on the list, Mr. Wendler, and will appreciate your help in trying to determine or define the qualities that determine that.



CHAIRMAN SOUTHWICK: We shall go on, now, to the chemical functions. The mechanical functions were easy. Down among these chemical functions is a good place to get into trouble.

The first one will be discussed by Mr. Graebner.

MR. GRAEBNER: This first item is PI-MC-1—Water-Vapor Permeability at 100 deg. F.

As Mr. Leinbach pointed out, package engineering ties up intimately the factor of water-vapor permeability with the performance of any package as far as moisture loss or moisture gain is concerned. As a result, this method of testing has been the subject of much individual and committee effort. TAPPI did a job on it several years ago and had a committee which turned up with an excellent method for that period. I refer to that in that way because several years ago we did not have developed the types of better packaging materials that are available at the present time. Also, the art—or, rather,

I should say the engineering—had not advanced to the point where it is today. The older method of TAPPI, while I said it was excellent, had a rather low gradient of vapor pressure existing on the two sides of the sheet. As a result, when we encountered some of the better packaging materials, it did not adequately differentiate between materials in these lower ranges. TAPPI has recognized this, and has had a committee working on the job during the summer, and they made a report on it at the Chicago meeting back in September.

Since that time a revised method has been in process of preparation, which embraces the idea that is prevalent today on water-vapor permeability testing, and that is to increase the water-vapor pressure gradient or differential, if you want to call it that, by making this test at higher humidities, somewhere in the range of 90 to 95 per cent, with a low humidity approaching zero on the other side of the membrane.

The old TAPPI test, which is still on the books, had a low relative humidity on the one side, with only 50 per cent of relative humidity on the other side. The result you can readily see—that with the higher humidity existing on one side of the membrane, we are going to have higher ratings, and are going to be able to differentiate between the more moisture-resistant papers. As I say, this TAPPI method has been going along, and it looks as if it can be lifted bodily and put into this manual. There are a few questions to be settled on the technique, but the technique and the general principle evolved have been well established in the minds of most people.

CHAIRMAN SOUTHWICK: It does not do very much good to run your transmissions too far away from your temperatures of use. So it seems advisable to have a method of testing water-vapor permeability at 0 deg. F., which is the common point of frozen food storage. We have a method worked out on this one—which consists of a similar cup arrangement to the hundred-degree test—the high humidity test—but with special compounding of the adhesive, the wax sealing agent, to get flexibility at zero rather than at 100 deg. F., and also to stand the thermal shock of being exposed at zero to room temperature. The test method is brief. It consists of a tight metal box in a frozen foods cabinet operating at zero, with a box containing a rack, and also a suitable amount of cracked ice being used to maintain the vapor pressure, and the metal box being put in the frozen foods cabinet to level out any temperature differences and prevent the colder walls of the box from affecting the vapor pressure inside.

In other words, with ice in this metal box, we have a saturated atmosphere at zero and using calcium chloride inside the test cups.

The procedure is as follows: The samples are made up as usual. In this case they are allowed to age something in the order of three days, rather than the usual 24 hours in this box, with the cover down tight, in the zero room. They are then taken out and put in a desiccator for a period of at least 24 hours. I think you all recognize the problem we are trying to overcome, and that is the fact that you take any metallic object from 0 deg. F. and try to weigh it, and with ordinary balances you are going to get concentration when it is taken into ordinary atmosphere. We are going to put it through this desiccating cycle to bring it up to temperature, without causing any additional transmission and without having any surface condensation to affect the accuracy of the weighing. After the initial weighing, the sample will go back in the test box, in the test atmosphere, and in this case it will stay for two weeks. Ordinarily, the water-vapor permeability tests are run off in three days, but because of the extremely low

vapor pressure—one milligram of mercury—it is in this test atmosphere for two weeks. As a matter of fact, there are some materials that it is a good idea to put in for 30 days, and then the procedure is repeated, and the net result, multiplied by the factor, gives you the transmission. It is a procedure based on a certain measure of 100-degree tests, which is very good for the frozen foods industry.

Mr. Leinbach will now describe the procedure under PI-MC-3.

MR. LEINBACH: This is concerned with air, carbon dioxide, oxygen, nitrogen and fixed gases permeability. The test, which has, so far as we know, the best background and research behind it, is the Shuman and Elder test, developed by Dr. Shuman and Dr. Elder, of the General Foods Corp. Essentially, this consists of holding the test specimen in a chamber, supporting it in such a way that one side of the sheet can be evacuated and the apparatus so arranged that the gas transmission can be determined by circulating it across the opposite face. As that gas works its way through the specimen, it gets into an area that has been evacuated. This, of course, will register a slight change in the pressure within that space below that sample, and that in turn is measured by a change in the level of mercury of the manometer. That can be calculated back very readily, as you know, knowing the volume of that space below the sample, and it can be calculated back very readily into the actual volume of the air or the oxygen or the fixed gas that came through the sample. The time factor, naturally, is controlled by the length of the test.

There is considerable work behind this test, and it looks like a pretty good one. I think perhaps some of you read about it in MODERN PACKAGING a few months ago.

CHAIRMAN SOUTHWICK: We are getting into the unknowns among the unknowns here.

The next one is still further removed into the nebulous state, and that is the PI-MC-4, Organic Vapors (Flavors, Aromas) permeability. I think you all recognize the importance of being able to measure the permeability of materials to flavor ingredients. If they are present in small quantities they are extremely vital to the acceptance of your product, and we are long overdue on a satisfactory means of evaluating the migration of this material through a package structure. We would very much appreciate anyone's giving us clues or information or help of any kind on how this test should be run. We frankly admit we have nothing. I wish you would all think about it, and give us any help you can.



The next one is PI-MC-5—Water Penetration, which I will turn over to Mr. Graebner.

MR. GRAEBNER: Water penetration has been given consideration by the paper industry for a long time, and here again we have a case where TAPPI has done considerable work. The opportunities are good that their methods will suffice for this job, as well. There are a number of methods, depending on the type of water penetration that is involved. There is the dry indicator test, which is well-known to people in the paper industry but may not be applicable to all other types of packaging materials.

Considerable work has been done on a fluorescent-dye test. That comprises the test existing in the paper industry. Possibly other people concerned with packaging have devised

certain tests. If so, I know our chairman would be very glad to have them.

CHAIRMAN SOUTHWICK: Mr. Leinbach, will you please go on with Item PI-MC-6—Oil and Grease Penetration?

MR. LEINBACH: Talking about oil and grease penetration is something like the problem of water penetration. As you think about it, you realize that moisture-vapor transmission (that is, water-vapor transmission) is a control of flow. When you get into the problem of water penetration and water resistance, or oil and grease resistance, you are talking about what might be determined as an absolute test or almost a destruction test. In other words, either the grease comes through or it does not. After it has come through, you are only mildly concerned with the rate of flow.

Now, this problem (as you present here know) is one that has been battered around and is still being worked on at a tremendous rate. Actually, the whole problem is one of a test designed for production control as against a test designed to show the specific performance of a particular material against a particular grease.

A person who is running a mill or a paper machine has to have a test so he can tell, in any reasonably short time, how he is doing. The opposite of that would be for him to use a test in which he would not know for two weeks how well he had performed at the time he ran the paper, which would be disastrous. The TAPPI test involves the use of a typical oil in the form of turpentine, and, as you know, it simply measures the length of time it takes for that turpentine to work its way through the material tested.

The thing that has been criticized very severely, and the criticism that has been raised, against the turpentine test, has been raised because you now have coating materials and new films coming on the market. Some of these coating materials may be quite adequate in their resistance to certain greases, but they may also be soluble in turpentine. Therefore, if you apply the turpentine test, you dissolve the coating, and it is all over. And it would in no way show the permanence of that material against lard, for example. Therefore, without omitting the turpentine test as a good standard proven test—because it certainly has been shot at from all angles and still stands—still we believe that the Packaging Institute test, besides including that, should have a second division which would be based on performance of specific materials when they are in contact with specific oils or greases.

Of course, the time would be that which it takes for that grease to get through there, and, naturally, you would have to control temperature and see that enough samples were tested so that the results would be representative. I think, in general, that represents the thinking that has been had on this matter of oil and grease penetration.

CHAIRMAN SOUTHWICK: We next have a series of four tests:

- PI-MC- 7—Static Fold
- PI-MC- 8—Dynamic Fold
- PI-MC- 9—Surface Abrasion
- PI-MC-10—Aging
 - (a) temperature
 - (b) oxidation
 - (c) light

These are considered supplementary tests for some of those that have gone before. Mr. Graebner will briefly outline these test procedures and the reports.

MR. GRAEBNER: The next four test procedures which have just been mentioned are important particularly from

the viewpoint of their effect on the preceding six procedures, covering what Mr. Southwick has referred to as "proofness." We all know the story of having tested a packaging material and having reported and found excellent water-vaporproofness or greaseproofness, or waterproofness or gasproofness, and then finding that it disappeared after the sheet has been creased or folded. Therefore, obviously it is important to know how these materials will perform after they have been subjected to standard methods of folding or creasing.

The first one, Static Fold, is encountered very frequently in many packaging operations. We have a suggested method that was developed by the Institute of Paper Chemistry, primarily at the request of the Quartermaster Corps. This method involves taking a sheet, folding it at intervals, and the intervals depending on the size of the sheet to be tested. A little differently, the plan is to have a given linear amount of creasing in proportion to the area, so that the test can be correlated between laboratories, regardless of the size of the testing cup that you may be using in, for instance, water-vapor permeability work. These folds are made in both directions—that is, the paper is folded face to face under standard conditions of temperature, weight and time. It is folded back to back. These folds are also made in opposite directions in the paper. In other words, when you are finished you have a checkerboard effect, and each successor fold or parallel fold has been made in the opposite direction.

On the matter of Dynamic Fold, there is a need for a test that would have a tendency to injure a sheet in a manner similar to that which you may find in a bag-making operation, in which a web of paper is pulled over a former, creased and folded dynamically. That is one of the methods that is rather in the embryonic phase. We have had a number of suggestions and ideas involving attempts to make a fold by passing the sheet between revolving wheels. Nothing concrete or specific has been developed.

This is another one of those tests on which we would like to have your suggestions.

As to the next point, Surface Abrasion, it may take place in a variety of packaging operations. It may take place, again, in bag manufacturing, in lining machines, and, as a result, the need for some test which provides a standard surface abrasion is necessary. Here, again, we have nothing specific to offer. However, it has been suggested (and it is just a suggestion) that some standard abrasive material, such as a fine sandpaper, be applied to the surface of the sheet in question and subjected to a specified rate of vibration for a given length of time as maybe a starting point. Here, also, your suggestions are welcome.

The next point, PI-MC-10, Aging, includes temperature, oxidation and light. Many of you have had the experience of examining a sheet of packaging material that appeared to have excellent properties. Perhaps a month or two later, or six months later, it had lost many of these properties. Of course, here we are speaking in connection with the chemical tests. There have been many cases where a sheet had excellent water-vapor permeability or grease-proofness, only to have lost much of it after six months of storage.

This is still another case in which standards have to be set up and unquestionably a lot of people have had experience in that field. Some of the conditions may have to be rather arbitrary at the start. For instance, exposure of a sheet of material to 100 deg. or 120 deg., for various periods of time, would have an effect upon its properties in many instances.

Oxidation is another important factor and here, again, the conditions probably will be arbitrary. Again, suggestions

from the members will be gratefully accepted.

Light also has a tremendous effect on many packaging materials. The procedures have been to expose the materials to north daylight, south daylight and some from the roof, But here, again, south daylight and north daylight are not always constant. They vary from day to day, and vary also in values from season to season. It would be desirable to have some artificial means of subjecting papers and packaging materials to various types of light. Some people use ultraviolet light. Again it is known that the infrared end of the spectrum has some effect on certain packaging materials. The field is wide open; but it is an important one, and we would like to have your ideas.



CHAIRMAN SOUTHWICK: We have one small item left—Subdivision C, the "Visual Evaluation of Packaging Materials," which will be covered by Mr. Leinbach.

MR. LEINBACH: Briefly, this is an effort to put down some of the tangibles that are visual qualities. TAPPI, of course, has well-organized and well-developed tests for opacity and for brightness and reflectivity. Regarding transparency, I don't know right now of a non-restricted test on transparency that is available. Again, let us say very briefly that we would like to have any suggestions or help that you can possibly offer in the measurement of transparency. We would like to have any suggestions or help that you can give us in measuring other visual qualities which are tangible, which can be measured, and which are of interest in packaging.

I think that is about all the time we should take with this particular part of the program.

CHAIRMAN SOUTHWICK: The next group is VII—Product Tests (Contents of Package). I know you are not vitally interested in them, although you do appreciate the need for them.

Here, again, the Institute should cooperate with other groups which are better able to do this product work. We have outlined certain obvious characteristics such as bulk density, abrasiveness and then, down in the chemical characteristics, there are items such as humidity equilibria, index of failure to moisture and index of failure to oxygen, free water, free oil or grease, chemical activity, both in acids and in alkalis. We shall not describe them. Finding free oil and grease is somewhat of a misnomer. How free is free?

We shall go on, then, to the last section, Section VIII—Package Tests—which is, after all, the nucleus of this whole deal. You are going to test the materials but you want the final evaluation of the package as formed.

Under the Package Tests, we have the first group—Mechanical:

- PI-PM-1—Compression
- PI-PM-2—Tumbling
- PI-PM-3—Impact

Probably all of you know that the manufacturers of outer containers, corrugated cases, have based all their development work on engineering and tumbling methods and on impact methods. I think the same general techniques can and should and will be applied to packages. I don't think we know enough about the durability of packages. This is, of course, again, distinctly different from the durability of materials. Here is a very pointed case where the Institute must

do some work. If any of you have suggestions on how to adapt the outer container test procedures to this work, or if you have any test procedures which you have done yourselves, we shall be delighted to have them. We think that these are three important subjects, and we don't know anything about them.

The next group is Chemical Package Tests. We have three there that are quite alike:

PI-PC-1—Moisture Change (CaCl_2)

PI-PC-2—Moisture Change (Normal Contents)

PI-PC-3—Fixed and/or Organic Gas Change

In the first two procedures, the method of evaluation or determination of moisture change will probably be identical, the only difference being that No. 1 is the standard test, because the contents in this case will always be calcium chloride, and you will always have a basis for comparison. Probably in most cases you will run No. 1 and No. 2 together, because you are interested primarily in some particular product. In the case of a tube it would be nice to have your record as a common denominator which would be the calcium chloride test.

Briefly, we will call one the standard procedure and No. 2 the product procedure. Both tests are exposure of packages to certain humidities, and weight gains reported. I think we shall only put down procedures similar to those which most of you people are doing. I have gone over carefully the letters from members, and I find that by and large most people are using a similar method of moisture gain test. There is probably more than one means of measuring the moisture change, but we will use in these two cases first, examination of contents and, second, gross weight. I think those tests are probably in the best shape of any of them, too.

The other one we have here is Fixed and/or Organic Gas Change. We had to have an outline to cover the field. By the way, that is designated as PI-PC-3 on your outline. It includes both oxygen and flavor change. The procedure there, of course, will be to use a similar test atmosphere, but examination will probably be by a different means.

Mr. Graebner will now describe the next item—PI-PC-4—Water Penetration Test for Packages.



MR. GRAEBNER: Here, again, there is no standard method that has been adopted by any group at the present time, and unquestionably a lot of individuals and individual concerns have their own packaging tests. As a starter, there are two procedures that might be suggested. One is to subject your finished package to water emergence in a standard amount of water at standard temperature and for a given length of time—again weighing the package before and after, and pouring off the surface water before weighing; then examining the contents and determining moisture content on the contents, which may not even be necessary if you have had any substantial penetration of water. It can be done probably by visual means, as we have visual penetration of water into your product by the package.

There is another possible test that has some interest and that was developed by the Surgeon General's Office, I believe, in connection with some of the water packaging problems. They suggested the use of plaster of Paris on the package, which then is submerged in water. A very slight amount

of water penetrating through the package, of course, will cause immediate caking and hardening of the plaster of Paris. This condition is immediately noticeable upon opening the package and examining its contents. I have seen some of the tests made in this manner and they are really very interesting.

As I mentioned in starting this, there are probably other tests and procedures being used, and we would like to have them and know more about them from any of you who can help us.

CHAIRMAN SOUTHWICK: A final item on the list is PI-PC-5—Oil and Grease Penetration. That will be handled by Mr. Leinbach.

MR. LEINBACH: Briefly, the oil and grease penetration for packages follows somewhat the same lines as that described for materials, in the sense that it is concerned more with performance with respect to a specific grease than it is concerned with a performance respecting a standard oil or grease. The procedure on which we expect to go, in the first proposal, calls for putting the product which contains the free oil or grease into the package, storing the package at probably 100 deg. F. some of them in normal position, some of them inverted, some of them with the wide face down and some with the narrow face down (in the case of rectangular cartons). I think if the liner is removable it will be recommended that it be used as the test. If there is no liner we shall have to use the carton as the surface on which the result will be noted.

CHAIRMAN SOUTHWICK: We have some numbers down on the outline under the heading of "Visual," but we have not even a good idea of them. That is the end of the test procedures which we have thus far outlined.

We are sorry we could not have analyzed these a little more. We are going to try to put this all together in the next thirty or sixty days, and at that time we shall mail it out to the members of the Institute as a beginning of this very important work.

MR. PROUDFIT, *U. S. Rubber Co., Passaic, N. J.*: Has the resistance to rodents and infestation and so forth been studied?

CHAIRMAN SOUTHWICK: I think that is one of the things we have missed. If you have any suggestions on that we should be delighted to have them.

MR. HILSDON, *Standard Cap and Seal Corp.*: With regard to rigidity and stiffness, has any work been done on that? I don't notice it in the outline. Also, has any work been done on the inertness or springiness of material?

CHAIRMAN SOUTHWICK: In other words, you suggest a test on inertness, and on stiffness or springiness. We have not included that. Do you know whether there exists a test for either property?

MR. HILSDON: Very crudely, yes.

CHAIRMAN SOUTHWICK: That is good enough for us. Please let us have them.

MR. HARTMAN: Again, on the subject of abrasion, the importance of finish and its effect upon converting machines has been raised. The importance of finish I think also comes into consideration on the matter of ability to stack packages. In other words, the slipperiness of the surface has a bearing upon that.

With regard to abrasion tests, I might say we have developed a machine which will record the effect of abrasion of one sheet against another, of similar material.

CHAIRMAN SOUTHWICK: In other words, you feel that slipperiness is an important characteristic in the stacking of materials. That is one thing we did not think of. I am

also making a note of the other phase that you mentioned—namely, the abrasion resistance of materials together. We would like to see a procedure on that if we could have one.

MR. HATCH, *Hartford Empire Co., Hartford, Conn.*: With regard to package engineering, when you depart from a rectangular package to one of odd shape, such as a cylindrical package, for example, the relation of diameter to height becomes important, particularly as it affects the total volume of the packing case itself. It might be well to include that for those who have to deal with a cylindrical or other special-shaped package.

MR. LEINBACH: By that you mean to include a study of the effect of the ratio between the volume and the area, as the ratio between the diameter and the height is changed?

MR. HATCH: Yes; as it affects the total volume of the packaging carton in which you are shipping. I refer to it as cubic ratio, meaning the ratio of the volume of the contents to the rectangular closure of the bottle or jar, in the case of glass.

MR. LEINBACH: The ratio of volume of content to the rectangular volume of closing the container.

MR. RUSSELL, *Oliver Machinery Co.*: It does seem to me that your approach is good on what I would call the chemical aspects of packaging. On the mechanical characteristics, however, I should think it would be wise to correlate your efforts with those of the machinery people, because many of these efforts obviously belong in the laboratory.

MR. LEINBACH: As I understand, you are making a point similar to that made by Mr. Wendler, of duPont, earlier, that the qualities which determine the ability of a material to handle on a packaging machine, should be defined and should be brought into a measurable area of concept. I think it is true. I think it is of very great interest both to the Production and the Machinery divisions. I think we all realize how complicated it is, but I do very much agree.

MR. WENDLER, *duPont de Nemours & Co., Inc.*: One characteristic that might be considered reciprocal to slipperiness is static rating. While it does not relate itself to a straight numerical rating, nevertheless the function of static is very helpful, and of extreme importance.

MR. LEINBACH: That idea of static rating, and the tendency of materials to take and hold electrical charges, is an interesting one.

MR. CAMP, *The Dorr Co.*: I have not heard mentioned here the name of the American Society for Testing Materials in connection with the source of information on various tests. They have done a great deal of work along many lines, such as abrasion, tumbling, exposure to light, and so forth, on many materials that are concerned in this work. I think it would be worth while to consult them for information on methods of testing.

CHAIRMAN SOUTHWICK: I believe the ASTM uses many of the TAPPI standards for testing, and in this case we have indicated the primary source, rather than the ASTM tests. It may be, however, that the ASTM has other tests where they would be the proper source.

With reference to this matter of machinability and work with the machinery group, I think the machinery group would do us a great favor if they would break down some of these collective words, such as "machinability" and "pliability." There are a lot of other words that also have a number of elements having to do with physical strengths. We have taken certain well-known physical strength characteristics and added certain other things which are particularly packaging properties—seal strength, blocking characteristics and pli-

ability. That is just a beginning. There are other factors; and if the word "machinability," for example, could be broken down into factors, and if we could measure those factors, we could develop a pattern of measuring some of these collective words, and we would be delighted for any suggestions of other factors of this kind which can be measured.

MR. PITT, *Sherman Paper Products Corp.*: On the matter of pliability, sometime ago I saw a testing apparatus designed for testing the pliability of papers.

CHAIRMAN SOUTHWICK: Can you indicate the source?

MR. PITT: Gummed Products.

MR. SWEET, *Colgate-Palmolive-Peet Co.*: I believe you will find other instruments that have been developed for testing in this field. There is an instrument that was brought out by Tinnius-Olsen Testing Machine Co., Philadelphia, for testing the flexibility and elasticity of sheets and also an instrument by the Tour-Marshall Co., a stiffness tester.

MR. DAUM, *Johns-Manville Products Corp.*: The Forest Products Laboratory has developed equipment for testing the ability of fibreboard to stand up under bending.

MR. LANDIS, *Atlantic Refining Co.*: We, of course, use finished products, and we are very much interested in the moisture test that we have heard of here. It would be very interesting if you could have a test for cartons.

Another thought that has not been brought out here is this: how about the pulling away of fibre board packages from the bulk materials packed in them—the liners pulling away from the product itself? We are selling products to a lot of people who say that our product does not pull away. Is that under one of these headings here for study?

CHAIRMAN SOUTHWICK: No, we have not thought of it.

MR. LANDIS: Take asphalt, for instance. Asphalt is being sold in paper, and unless you can pull that paper off, you will get complaints. We are having quite a lot of trouble getting the container manufacturers to give us packages that will pull away from some of the new products. That might be worthy of consideration under suitability of packages. Work has been done on smaller packages that are put inside of outer containers. But how about bulk materials put right in the fibre container, such as wax, asphalt and greases?

CHAIRMAN SOUTHWICK: That is an excellent point. If you have done some work on this we would like to have a tentative procedure from you.



FRIDAY MORNING, November 5

Materials in a War Economy: Panel Discussion—Presiding: WALTON D. LYNCH, *vice-president, National Folding Box Co., New Haven, Conn.* **Members of the panel:** J. D. MALCOLMSON, *technical director, Robert Gair Co., Inc., New York*; A. B. HUYSSOON, *vice-president and sales manager, Continental Paper Co., Ridgefield Park, N. J.*; SOL BUSCHMAN, *president, National Can Co., New York*; FREDERIC REMINGTON, *president, Peerless Tube Co., Bloomfield, N. J.*; C. M. CONNOR, *technical director, Glassine Paper Co., Conshohocken, Pa.*; M. A. BROWN, *advertising manager, Plastics Division, Monsanto Chemical Co., Springfield, Mass.*; DR. J. H. TOULOUSE, *chief service engineer, Owens-Illinois Glass Co., Toledo, O.*

CHAIRMAN LYNCH: Each of the seven well-qualified authorities we are privileged to present to you this morning will give you a brief, right-to-the-point report regarding the present availability of the type of materials with which he is

thoroughly familiar, and we will welcome questions from the floor.

Mr. Malcolmson, what is the corrugated and fibreboard situation today in regard to its present availability?

MR. MALCOLMSON: It happens in our industry right now that we have the largest bank of unfilled orders in our history, and yet we are making boxes at a smaller rate than in 1941, which was our record year. The reasons are the typical reasons that you are all familiar with, namely, raw material and manpower. I don't see at the present moment much hope of relief on either of those subjects.

CHAIRMAN LYNCH: Mr. Huyssoon, what is the condition at present in the paperboard field?

MR. HUYSSOON: Anyone who is at all involved in the purchasing of paperboard, knows that the situation is very critical and very acute. As is true with the situation of fibre containers, paperboard used for cartons and boxes of all kinds, depends entirely upon waste paper for its raw material. Production has been steadily declining from a peak of some 157,000 tons a week early this year, I think, down last week to 143,000 tons. The outlook is not too good. I don't know just what we can look forward to, but I can see right now it is going to be damned serious.



CHAIRMAN LYNCH: Mr. Buschman, what is your situation on metal containers, tin containers?

MR. BUSCHMAN: Tin containers are now available for products earmarked for the Army and the Navy, for Lend-Lease and for civilian use. Since February 1942, allocation of production for these used has been under rigid Government regulation. The War Production Board through Order M-81 has carefully specified the products, the quota that may be packed in cans, the sizes permitted and the specifications.

If your product falls within any of the 93 classifications listed in Order M-81, covering food products, or in any of the 50 classifications covering non-food products, it is my opinion that tin can manufacturers today have the facilities to supply you with all of the tin cans that the Government states you can have.

CHAIRMAN LYNCH: Mr. Remington, what is the situation on collapsible tubes?

MR. REMINGTON: I should be inclined to say that it is very good in this respect: If you have previously been a user of collapsible metal tubes, you are quite apt to get the same number that you received during the year 1943, not '42, but '43. The industry's output has been about 135 per cent above 1942 output.

The various Government orders have controlled the type of metal used so that the net result is that we are producing about as much as we can possibly produce, but if you were a customer of a tube company you are quite apt to be taken care of in the same degree that you were before.

I would issue a word of warning to every manufacturer in the room who uses collapsible metal tubes. That is to save every last chipboard box that the tubes are packed in, and every last corrugated box and send them back to the collapsible tube manufacturer. The production of tubes may not fall down, but if we haven't got anything to ship them in, we will be in a very bad position.

CHAIRMAN LYNCH: Mr. Connor, what is the situation in regard to protective papers?

MR. CONNOR: From a raw materials standpoint, the situation is just as serious as it is in the board field. It might be considered somewhat more serious, because the protective paper field requires specialty pulps. Those pulps obviously are a little more difficult to get on short notice, at least, particularly at a time when the inventories of those materials in the mills are down to an absolute minimum. The tendency, as far as the mills are concerned, at the moment, is to keep operating to their full production, whatever production, whether it is five days, six days or seven days, depending on how they have been operating. The attitude of the War Production Board has been to maintain that production in so far as they can possibly do so. Obviously, they have a problem of distribution of the raw materials, and an attitude of keeping all of the industry—not only the protective paper industry, but the whole paper industry—operating, and their problem obviously becomes one of maintaining a distribution for the entire industry which is in line with essentiality, as far as civilian use is concerned.

CHAIRMAN LYNCH: Mr. Brown, what is your situation?

MR. BROWN: Putting it briefly, all the commercially important types of plastic materials are under strict allocation. We are able to take care of the direct requirements of the armed forces with some material left over for essential civilian purposes. The amount left over for civilian purposes varies from one material to another, but in thinking about transparent coverings and of plastics, in general, two things should be remembered: That the packaging uses of plastics are competing with the non-packaging uses of plastics by the armed services.

The second fact to remember is that, compared with other packaging materials, the over-all capacity of the plastics industry is relatively small. There hasn't been, except in some materials, a very great expansion, and therefore the amount that we have to play with is fairly limited.



CHAIRMAN LYNCH: Dr. Toulouse, what is your situation in the glass field?

DR. TOULOUSE: The glass container industry has been working to capacity for about three years now, although that capacity has been increasing all the time.

The general situation is that we are able to fill all but 15 to 20 per cent of the demand. It is for that reason that certain items that are considered less essential than others have been placed upon various quotas. The chief problems with us are not so much raw materials as they are fuel and manpower. Any marked restriction of fuel or any marked decrease of manpower is going to cut our production and at the same time cut the quotas or allotments given various industries.

We began to feel this pressure back in '41, and I will just add a little bit of statistical information. We are now producing 78 per cent more glass by weight in bottles than we were in '40, and there has been a 140 per cent increase in the capacity of these bottles for products. So we have been keeping pace with the demand, as much as we can.

There are two things I might suggest, and one of them is in the line of cartons. Something can be done for glass containers by increasing the package unit, still keeping it under, of course, the shipping limits. There are cartons containing dozens which might more skillfully use a carton material if more cubicle packages were made, say, two or three dozen in

two or three layers instead of the present way it is done.

The second is that narrow-mouthed containers are a little easier than wide-mouthed containers. Wide-mouthed containers are used for food products and such. Any user who could use either narrow- or wide-mouthed bottles can help relieve the glass situation by using the narrower sizes because some of the capacity for bottles of that type cannot be converted to wide-mouthed containers.



CHAIRMAN LYNCH: Now I would like to know what are the prospects for the next three months in these respective fields?

MR. MALCOLMSON: Unfortunately, we are not very hopeful about the prospects for the next three months, because we do not see much help in the way of our raw materials and manpower difficulties. On manpower, of course, everybody knows where we stand.

As regards raw materials, they are chiefly waste paper, and to a lesser extent, new pulp. Even if new pulp is increased by the cutting of more pulpwood, it will take more than three months for that to trickle down through the various stages to the point where you make corrugated boxes out of it.

As regards wastepaper, we are still in the critical situation there. Many of you people remember the wonderful response the public gave us in 1941 on the wastepaper drive. In fact, so great that we had to call it off on account of having every possible inventory warehouse filled and stored it outdoors.

However, calling that drive off let the dies get cold, and now we are having a tough time reviving interest in that drive, although the need is more urgent now than it was then.

That single factor of waste paper is one that may help us in the next three months, but there is some question. However, the least that we can do now is to ask everybody in this audience if he will make it a personal matter to help this waste paper campaign and particularly in regard to the use of brown paper and old boxes. They make the best forms of waste paper for our industry. The use of old boxes will even have to be resorted to. We view that with considerable alarm, apparently, and yet there is no help for it.

So that, summarizing, I would say that for the next three months we still are going to be faced with a situation almost if not as critical, as at the present time.

CHAIRMAN LYNCH: Mr. Huyssoon, what is your opinion of the next three months in boxboard?

MR. HUYSSOON: I think Mr. Malcolmson has probably covered the major explanation of what could possibly be the situation in boxboard for the next three months. Our same problem, raw materials, is our most acute one. The mills themselves would run more evenly with their manpower problems if they had adequate supplies of raw material. I am afraid it is going to get worse before it gets better.

The mills are still eating into their inventories at the rate of 5,000 tons a week. Obviously, that can't keep up. Many mills are running on the basis of shutting down for a day or two or three days a week, waiting until they can accumulate enough paper stock to run.

I do want to say that I think there is plenty of waste paper available if it can be collected. The problems of getting it are more difficult than they were before, with less manpower available to collect it. The waste paper collection industry has always been a low-paid industry. They are having many

problems in regard to keeping their help, probably more serious than a great many people realize.

The transportation difficulties are much more acute than they were then. But I do think that with the proper amount of support the problem can be licked as far as giving enough paper to the mills to run their capacity.

That, however, doesn't necessarily mean that if the mills are able to run to capacity there is going to be enough boxboard for everybody. I don't think that there will. For the next three months I don't look for any improvement to any extent. I think that after that time if we can—I will stick my chin out a little bit and say that I think that possibly by the spring of next year, this paper stock collection campaign will really begin to produce results. It takes a little while to get those things organized, get them rolling and get the machinery working. I think I can hold out some hope for some improvement, but again I want to repeat that I don't think there is going to be enough to go around. Somebody is going to have to go short.

So far as you know, gentlemen, there hasn't been much in the way of any type of control as far as distribution is concerned, in paperboard. It is a terrific problem. Paperboard was the bottom of the barrel as far as substitute packaging was concerned. When they couldn't get metal for tin cans or things of that type, everybody immediately looked to substitutes and paperboard was one of the most available substitutes that there was. Now that substitute is at the point where it can't be used to any great extent further, and as far as I know there is no further substitute—going down still further—for paperboard, unless we go back up the ladder again to other types of materials which formerly had been declared as being more critical.

CHAIRMAN LYNCH: Mr. Buschman, what is your opinion of the next three months in metal containers?

MR. BUSCHMAN: The scarcity at the present time in tin cans is due to the shortages of both raw materials and manpower. As a consequence, the outlook for the next 90 days cannot be viewed with optimism. The WPB knows where the pinch is most severe, and consequently it issues from time to time amendments to its various orders in an effort to relieve cases of undue hardship and actual distress.

For example, the most recent amendment, WPB order M-81, dated October 2, 1943, increases the allotment of tin cans for certain products because manufacturers have been unable to find substitute containers. While under prevailing conditions leniency is not to be expected from the WPB, if you find yourself in a distressed situation the only recourse seems to be another appeal based upon all of the facts to the WPB.

CHAIRMAN LYNCH: Mr. Remington, what is your opinion in collapsible tubes?

MR. REMINGTON: I should like to extend my prophecy beyond three months. The three months significance would be termed static, but within six months the products that are being considered by the Army and the Navy may change that picture.

But unless there are future plans of the armed services that will take a much higher percentage—and that I cannot prophesy—the picture will look about the same as it is now for from three to six months. I think that is as clear as I can



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make it from all present indications in our field.

CHAIRMAN LYNCH: Mr. Connor, what is your situation in your industry?

MR. CONNOR: It is rather apparent to me that we can expect a reduction in the next three months in at least some of our protective papers. It is reported that the pulpwood inventories are being depleted at the rate of 100,000 cords per month. It is also reported that those pulpwood cuttings for the year 1944 would be reduced by approximately 25 per cent.

There are some factors, such as improvement in the manpower situation, which may alter that latter figure. There are some other factors which come to work in favor of maintaining the production of protective papers. Protective paper pulps are specialty pulps, as I said before. They are relatively high-priced pulps. If there is going to be a shortage of wood for all pulp, the attitude of the pulp mills will be to make the higher grades, the higher-priced grades. This is going to increase somewhat, although only slightly, the yield from each cord of wood.

The chemical situation, glycerine and the pigments, has a direct bearing on what we can expect in the way of protective papers in the future. At the present time the glycerine situation is somewhat better than it was six or nine months ago. However, as many of you know, the pigment situation is getting definitely worse. The revision of certain grades and the modification of certain grades using glycerine and using pigments may minimize the effect of the deficiencies of these materials. It is difficult to foresee, however, that a reduction in pigments, which is definitely going to affect the paper industry, is not going to make a difference in the light protective or lightproof protective papers inasmuch as our reduction in pigment is quite drastic at the present time.

There are some other factors, such as the manpower situation, which will have to be considered. Generally, it would seem that the reduction, taking all of the five different factors into consideration, might run in the order of possibly 10, maybe higher, per cent.

A great many protective papers rely on the use of kraft pulp. Obviously, the demand for kraft pulp in the fibreboard field for Army and Navy use is making a great deficiency of that pulp as far as some of our protective papers for civilian use are concerned.



CHAIRMAN LYNCH: Mr. Brown, what is the situation in your industry?

MR. BROWN: There again the situation varies from one plastic to another. There is one observation, though, that applies to the industry as a whole. Until fairly recently the control in our production has been raw materials. In the case of many companies operating in critical labor areas, the control is tending to become more and more a manpower situation. We are chemical plants using in the main unskilled or semi-skilled people. We are limited in the extent to which we can put women into our plants and as a result in some cases plastics plants could be operating at a higher capacity using available raw materials but have been limited because of the shortage of manpower.

Now specifically, in the case of the rubbery elastomeric materials, there is likely to be some loosening of the restrictions on those materials. Those particular plastics were

used as replacement for rubber to a considerable extent.

If the synthetic rubber program continues to progress and the synthetic rubbers as such become more readily available, it is likely—or at least it is possible—that the demands of the armed forces on those particular plastics will be relaxed to some extent. But remember that at any time, as soon as the level goes down, the level at which point materials will be allocated is dropped into a less essential category, and the packaging uses are competing then with a great many essential and semi-essential civilian uses of plastics.

In the case of the molded plastics, we are likely to have substantially the same situation with the exception of polystyrene, which some of you use, which is likely to become somewhat easier. There again that hinges on the synthetic rubber program which manufactures as one of its raw materials the base material polystyrene. Now it is reported that the capacity for the production of styrene, which is a constituent of Buna S rubber, is somewhat greater than the capacity of the rest of the set-up to absorb it. Therefore, we are very likely to have a somewhat easier situation in that particular plastic.

In the case of the cellulose plastics the situation has some bearing on that in paperboard and related materials, because they, being cellulose materials, are basically from wood or in some cases from cotton linters. The situation there is not likely to change too radically.

CHAIRMAN LYNCH: Dr. Toulouse, what is the situation in the next three months on glass?

DR. TOULOUSE: It is relatively easy to answer for the next two months, because just Monday of this week L-103-B was extended to the end of the year. Beyond that it is difficult to say where the restrictions will be placed, but my guess—and this is merely a guess—is that some form of restriction will have to continue.

There are several reasons for concern this winter, even though the seasonal food period has passed and the demand for food containers will drop off slightly. Contrasted with that, of course, is the fact that during the winter is our chance to build up stocks. The reason for concern is the fuel and manpower situation. We are faced with the possibility that certain fuels in time of winter demand may be taken away from us for short periods, especially in areas where the strictly military demands for processed fuel are heaviest.

Some glass companies have been told that they may face a period in which they cannot get gas, or that they cannot get oil, and the producer of gas, of course, depends upon the coal situation, which we don't need to mention other than in passing today.

In 1940 we produced something like 54,000,000 gross of bottles in the industry. In '41, about 71,000,000. In '42, about 79,000,000, and in '43, where the full effects of standardization, along with other improvements will be felt, it jumped to 93,000,000 gross, or 20 per cent over last year. I don't want to give standardization all the credit, but to some extent that is part of a standardization function that is giving us greater capacity to produce.

Now on the manpower side, we are down to the point where women have replaced men about as far as they can.

The raw materials situation isn't particularly alarming. Our raw materials are generally non-essential: sand, of course, and lime being the two least demanded.

The only one giving us any concern—but no threatened shortage—is soda ash. The other materials for glassmaking have been pretty well stabilized. We have reduced our de-

mand a lot by standardization. Rubber is a lot easier for sealing the essential things, chiefly of food products, but it comes back to paper as being our chief disturbing raw material.

I might say that we would have to shut down a glass furnace if we are unable to get paper in which to pack the glass. That has been upon us very close several times this past year.

We do expect, all things considered, an increase of about 10 per cent in production next year, going to 103,000,000 gross, and in that are considered possible production losses due to shortages of supplies or manpower or fuel or possible disasters that could upset future operations.



CHAIRMAN LYNCH: Thank you. There is one thing I got out of this discussion here. There is going to be a serious shortage of paper. I never realized it even went back to the glass man, that he might not be able to ship his commodity, but to me it seems stupid that we as business men sit around and accept a restriction where there is plenty, because of a weakness, a lack of guts to get out and fight for what we want. I know that you men need shipping cases, cartons, to get your merchandise to the ultimate consumer. I also know that today you don't have to have a lot of direct mail advertising coming over your desk because the advertising man says, "We have got so much money; instead of paying it to the Government, we will put into a brochure to tell them that the railroads are fine railroads, our food is good, our service is good, but, for goodness sake, don't travel."

Just think, and ask yourself this question: Is it necessary to go to the store and secure a carton of cigarettes, or a package of toothpaste and have the dealer put that into a paper bag or wrap it up with a piece of wrapping paper? You answer the question. Is it necessary to have some of this direct mail coming over your desk today when there is a paper shortage?

Look at England. In England they are packing merchandise. Eighty per cent of all the material used in paper making goes into packaging. The other 20 per cent goes into papers for various other uses. In this country we don't do that. We have lobbies, we have politics and we ourselves are to blame, our own companies. If you men can go back to your own company today and say to the officer in charge, "What do you want? Do you want boxes to ship your stuff, or do you want to advertise a commodity that you can't sell?"

I have some written questions here, and after we finish with them we will take questions from the floor.

The first question is: "Do liners adequately protect the product when lead is used for collapsible tubes?"

MR. REMINGTON: That is a very important question. I anticipated that question coming to me, and so I will read off the answer. The responsibility of proof that a liner is satisfactory lies entirely with the manufacturer of the product. The collapsible tube industry has cooperated in determining the proper liner, but because formulas are changing rapidly and because as an industry we never did know the basic formula of your product, we cannot accept responsibility.

We will place liners of lacquer or wax in tubes to the extent

that our equipment will permit and to the extent that we are permitted to use lining materials under the restrictions of the War Production Board governing such materials, but we cannot help but stress that while liners have been developed that are extremely satisfactory, yet the responsibility lies on your shoulders as the manufacturer of the product.

CHAIRMAN LYNCH: The next question is: "Is it true that V-boxes are getting most of the available material?"

MR. MALCOLMSON: That is a question that comes up very often, and I know that the right answer is "No," and I think the best way to prove it is to give you very briefly some figures.

It is true that the great tonnage of V-boxes, a lot of that being solid fibre, has gone up in the last few years. For instance, the total production of solid fibre in 1943 was 100 per cent over 1938, but that is not the right way to look at it. The actual fact is that the production of solid fibre in 1943 was less than 10 per cent of the total of corrugated plus solid fibre. In 1942 this figure was 8½ per cent, and in 1941 it was 5.9 per cent.

In other words, while the V-box has gone up, both corrugated and solid fibre, the total amount of raw materials that they use in comparison with all boxes is around 10 per cent, very small.

Mr. Lynch, as long as I am one of the end men, I would like to ask you whether you have anything to contribute on the situation in folding boxes. We haven't covered that one this morning.

CHAIRMAN LYNCH: That is passing the buck. Well, folding boxes depend on boxboard. If we get the boxboard we can take care of the requirements on folding boxes. To get the boxboard we will have to have the raw material. As I see it, while there is an acute labor shortage the mills have done a fine job; they have put women into jobs that formerly were handled by men. I believe the capacity in this country is here. It is up to you fellows to see that the raw material is diverted into the right channels.

Now, I don't say, cut out advertising. I don't say stop wrapping articles at retail stores with supplemental wrappings. If you feel that is more essential to running your business than the shipping case or the carton, then throw the carton out and divert that material to the supplemental package, but it is up to you fellows to make that decision yourselves.

The next question that I have here is on cans: "Is the Government easing up on can restrictions?"



MR. BUSCHMAN: More positive limitations are ahead of us. Any easing up on can restrictions will depend upon military requirements and the available supply of steel. There is a strong possibility that tin-can quotas may have to be decreased next year. It is only reasonable to presume that as long as we have war our military demands will continue and Government restrictions will not be eased except in some unusual distress cases.

CHAIRMAN LYNCH: The next question is on glass containers: "Will the re-use of bottles relieve the glass container situation?"

DR. TOULOUSE: That may be a little touchy question to answer for this reason: I imagine many have heard of the new crazy regulation allowing certain limited re-uses on the

basis of—"if he is in trouble then all we need to do is to cut down the whisky, you say, 5 or 10 per cent of its former level, and everything will be lovely." Well, that isn't true, for the reason that the re-use of whisky bottles is almost impractical under the present serious conditions of shortages of different commodities.

For instance, that demands a channel for the sorting and the boxing and the return of the bottles. That means a certain amount of manpower in doing that job which is spread thinly over a great area. The Treasury Department's intention is, of course, that they come back from the user. That enjoins the used bottle market which is probably the best equipped for salvage and return, and it makes the return difficult and perhaps would decrease to a considerable extent any possible return.

Then, third, is the fact that, in general, the present filterers do not have to wash those bottles. Therefore, they are not equipped with the proper means to wash and sterilize, to cleanse the bottles before they refill them. Washing machines take a considerable amount of metal. They take attention; they take power, and I do not believe that any bottle-washing equipment is being made in the country today, so it is a physical impossibility for the distiller to buy bottle-washing equipment.

Add to that if you could get the equipment you would have to add a force of men to inspect the bottles as they are returned.

Then finally, present bottles are designed, and their weight particularly is such that they contemplate one trip only. It is a very easily demonstrable fact that the weight of the glass container as designed is tied up with ability to re-use it. In a mill, in the beverage and beer industries those bottles are a little heavier, and they are designed considerably plainer, compared to distilled spirit bottles. In order to make a bottle re-usable, it should have added weight to give it strength for repeated use, and this then would turn the tables in a very peculiar way in that it would put a demand for tonnage of glass on the glass industry now which they do not have, and the net result would be the demanding of more tonnage of glass, the making of fewer glass containers in the available time to meet the situation that this order was primarily designed for.

That singles out the distillery industry, but the same thing applies to the re-use of bottles for foods and other things. The question really should have covered re-uses generally, and there again the same distribution problem, return problem, the same bottle-washing problem, is in all of the industries except the Big Three that re-use the bottles, that is, the dairy, the beverage and the brewery groups.

CHAIRMAN LYNCH: Dr. Toulouse, there is another question which has just been handed to me: "What are the bottle manufacturers doing to insure sufficient supplies to pharmaceutical manufacturers? It is getting more difficult each day to get such bottles as amber round packers (whatever that is)."

DR. TOULOUSE: The situation there is probably tied up with the glass situation in general. That is, all branches are finding it difficult to get bottles. Pharmaceuticals are mentioned, and if you will pardon my reference to my own company's experience, one of our plants making pharmaceutical prescription-packed bottles, has blocked out its available production between now and after the first of July 1944. That industry, of course, has not been required to use a standard bottle, although much of the product goes in standardized bottles. If standardization were brought in there,

there might be an additional pickup in volume, but I can only say that that industry probably ranks next to foods in essentially and will feel less restriction than some of the others and their situation is no different from the general glass situation as a whole, in that all goods are having difficulties in placing orders, especially for quick delivery. The deliveries are slow because scheduling is a problem and because everybody who wants the bottles is, of course, getting his orders in and asking for delivery.

CHAIRMAN LYNCH: Here is a question on plastics: "Will there be lower cost plastics available for packaging users, and if so what type of plastic materials may we expect to have available at lower prices?"

MR. BROWN: I presume that question means in the post-war period. If that is the case, the answer is "Yes." Certainly, in some types we will definitely have lower-cost materials that will be better able to compete with the older packaging materials. The reason for that is that the chemical industry—and we are part of the chemical industry—has enormously expanded the production of some of the raw materials which we use. Most of that expansion is not necessarily being used in plastics today, but, chemically speaking, they are the same materials that we can use to make plastics after the war.

In some instances, the progress in the production of a raw material has taken place during the war that would have taken place possibly 10 or 15 years under normal peacetime procedure in getting a product from the laboratory into full-scale commercial production. The result will undoubtedly be lower cost in the raw materials that we use and hence lower cost in our products.



CHAIRMAN LYNCH: I have another question here on containers: "Is salvaging and re-use of corrugated cases necessary?"

MR. MALCOLMSON: It is evidently the Government's opinion that it is very necessary, because all the releases that have come from Washington in the past few days have urged the shippers to re-use containers wherever possible.

This is on dangerous ground, because you have to leave it to the judgment of each shipper as to what is a re-usable container. The freight regulations don't prohibit the use of secondhand containers, but Rule 5 of the classification does say that no container shall be shipped unless it is in a condition to insure safe and adequate transportation.

We view with considerable alarm this move because there is always a temptation to take a box that maybe wasn't any too good in the first place, and re-use it maybe the second and third time, and the loss and damage that might result in freight might be even more than the saving involved. The loss of good will is even more intangible and dangerous.

My recommendation would be that each shipper give serious consideration to the possibility of re-using and then don't just let everybody in your shipping department decide what box can be re-used. Instead, pick one capable man and make him solely responsible for the decision as to which box can be re-used, and in that way you can at least put all the responsibility on one trustworthy man for deciding that very important point.

CHAIRMAN LYNCH: I have a question here on tubes. "What chance do you think there will be that more tin will

be allotted to the industry because of the efforts of the Tin Salvage Institute?"

MR. REMINGTON: Tin is a very critical material and it is one in which the supply will continue to diminish and not increase. The tube industry never did get back the tin that it salvaged in the Tin Salvage Institute. That tin moved on to other war uses.

The net result is that I do not think there will be any additional tin allocated to the industry, but that the total amount under the present restriction order may even go down, so that there is more apt to be less tin available than more tin.

In turn that fits into the necessity for research on the part of the tube industry and its customers to supply suitable liners for the tubes now being made. The only exception to my statement will be the precise types of pharmaceuticals which are permitted to use tin under the tin restriction order. Such pharmaceuticals could get an increased over-all amount of tin solely because of the nature of the product



CHAIRMAN LYNCH: Here is a question on metal cans: "When the war is over and the present restrictions are eliminated, how long will it be before the can industry can convert to container manufacture?"

MR. BUSCHMAN: It is my opinion that for the greatest part, can manufacturing facilities are available right now. In other words, it remains only for the shortage of raw materials to be alleviated before we can swing right back into container production. There will be no serious delay in converting can manufacturers back to normal requirements.

CHAIRMAN LYNCH: I have another one while you are here: "I think many here would be interested in the present and future availability of a type of container not touched upon this morning; namely, steel drums in 55-gallon and 5-gallon capacity."

MR. BUSCHMAN: The demands for military needs are so great that in my opinion there is very little, if any, possibility for any release in the present restrictions. The war program as we know it, calls for tremendous step-up in 5-gallon and 55-gallon containers for gasoline, and I doubt whether you would be able to get any relief unless you are operating on at least a double A priority.

CHAIRMAN LYNCH: Here is another one: "The cosmetic industry has been cut to 65 per cent of its glass use under L-103. Will there be any special dispensation with respect to opal glassware that has been generally used by the cosmetic industry?"

DR. TOULOUSE: I think not; because the furnaces used for that glass, which is simply an opaque glass, are the same as used for other glass products, and since it is possible to convert those furnaces and make, for instance, food bottles, I don't believe that any special dispensation will be given the cosmetic industry.

CHAIRMAN LYNCH: This one is on boxboard: "What are the possibilities of further restrictive orders, or the issuance of control orders regarding the use of boxboard by the War Production Board?"

MR. HUYSSOON: Of course, any forecast as to what the War Production Board is likely to do is always very dangerous, but I don't think that the present thinking down there is along the lines of further limitation orders in the use of box-

board. I think probably any further attempt to issue control orders will be along the lines of partial allocation or partial priority.

It is almost impossible to consider the relative essentiality of all of the uses of boxboard for civilian requirements. It is easy to take off the top requirements for the armed service, Lend-lease, and so on, but after you have done that, to attempt to establish a 1, 2, 3 classification of requirements for civilian uses is a terrific job.

CHAIRMAN LYNCH: "Is there any change to be made in the weights of liner stocks of shipping containers in order to increase the amount of liner stock for shipping containers such as on lightweight liners, and so forth?"

MR. MALCOLMSON: I don't think so. Many people don't realize that their present Rule 41 is already an emergency rule to reduce the caliber. That rule was made effective November 15, 1941, for one year and at the end of that year the emergency still existed and it was extended several times and is now slated to expire next February 15. This emergency rule under which we are operating in the corrugated industry does permit the use of 9-point liners, 14-point and 23-point for the heavier boxes, and I know the railroads are firmly convinced that those calibers are too light right now and they intend to go back to the old rule or something very similar at the very earliest moment they can. At this point they feel that will be next February, so that in answer to that question I don't think there is much room for any further reduction in caliber without greatly increasing the chances of loss and damage in shipment due to ineffective protection.



CHAIRMAN LYNCH: Here is one on metal cans: "When tin cans are again available, will they be cheaper or more expensive than they were before the war?"

MR. BUSCHMAN: Inasmuch as the food containers and standard type can prices have been constant during the war period, it is reasonable to presume they should continue after the war. Whether the present price structure will remain undisturbed, in my opinion undoubtedly will be determined by the raw material and available labor costs existent after the war.

CHAIRMAN LYNCH: Another question on tubes: "Should collapsible tubes be looked to as a relief substitute to cover shortages of other containers?"

MR. REMINGTON: I should say distinctly not. That is because of the fact that the collapsible tube industry had better set itself on record as being sold out, at least, for the year 1944.

CHAIRMAN LYNCH: Here is one on protective papers: "What will be the effect of wastepaper salvage on the lightweight protective papers?"

MR. CONNOR: At first glance it would seem that the production of lightweight protective papers is definitely tied up with the salvage campaign. To some extent that is true. If the campaign is successful, obviously, certain pulps are going to be released for use in protective papers. However, the salvage papers cannot be used directly in most protective papers.

CHAIRMAN LYNCH: "What materials are available for small molded transparent boxes preferably with compartments for separating small metal items? Over-all size, roughly 3 X 6 X 2 deep, cover hinged or telescope type. What would be

the minimum thickness of walls of a box for such purpose? Net weight of contents up to one pound."

MR. BROWN: The materials available would depend on the actual product that was going into the box. If it were a war product or a fairly high level of civilian essentiality, we could use any one of three or four different materials. Polystyrene, possibly; phenol-formaldehyde, for example. I wouldn't try to answer the engineering questions until I see a blueprint.

CHAIRMAN LYNCH: "Are AA-1 orders given precedence over lower rated orders in the corrugated box industry?"

MR. MALCOLMSON: I think if they are not we are liable to have a \$10,000 fine and a year in jail, or something like that. Actually, though, we have to file a rating pattern with Washington at stated intervals showing exactly how much percentage of our business is in each of the different categories and those, of course, are all subject to checking up, Government inspection, and so forth. I haven't said a word about the integrity of the industry, but I can assure you that those AA orders are observed very religiously.



CHAIRMAN LYNCH: Here is a corker: "Are 7½ per cent tin lead collapsible tubes to be made available after the first of the year? This question is in reference to the announcement that probably after the first of the year only coated lead tubes will be available. If the above is true, are lacquers and waxes to be made available in this use for pharmaceutical packages? Can we look for an easing up of the waterproof paper situation for export government packaging in the next two or three months? Have any developments been made, or is any development in process on other substitute metallic tubes?"

MR. REMINGTON: Well, there are really two separate questions there. I won't even touch on the one relating to paper or waxed papers of any kind.

As far as tubes are concerned, I am not at all sure that 7½ per cent tin coated or alloy tubes are going to be withdrawn. I am hoping that they will not be withdrawn.

However, if they are, I think that the over-all wax picture, which is the only one that I can answer at this moment, is sufficiently good that pharmaceuticals would probably have good resistant waxes allotted to the tube industry for that type of coating.

That is only a personal opinion and the first thing, as I said, about hoping that 7½ per cent would be retained is also a personal hope. I have not been given any clear indication that they expect to withdraw that particular type of tube from the market for pharmaceutical use for the present time at least.

The last part of the question, as I recall it, deals with other materials. There has been considerable work done by, I might call it generally, the plastics industry in the production of a plastic tube or plastic tubes. I am not in any position to answer the extent to which they have been successful, and I simply know that the collapsible tube industry is in the position that it thinks there will be an adequate supply of lead and a sufficient amount of allotted tin to continue its present volume.

CHAIRMAN LYNCH: Mr. Connor, do you want to answer that question on paper? It says, "Can we look for any easing up of the waterproof situation—the waterproof paper situa-

tion for export Government packaging in the next two or three months?"

MR. CONNOR: I am a little bit nonplussed, because I didn't think there was a great shortage there. Those of us that are more interested in the civilian field, so far as waterproof or moisture-vaporproof barriers are concerned, have had some considerable difficulty in getting materials because of the greatly increased demands for overseas packaging.

There are in the wax fields a great many substitutes being developed at the present time. Some of them are relatively wax-free. That is going to extend the amount of wax which is now available for those uses, and if the demand for overseas shipment continues to grow, it can grow probably to the extent that wax can be extended.

MR. REMINGTON: I would like to amplify my statements, particularly after what the last gentleman has said.

There are a great many different types of waxes that are used by the collapsible tube industry as inside liners. Some of them are critical. Some are not. When we first started lining tubes with waxes, it was our desire to give the customer the best available wax that could be obtained.

However, there are a great many products on the market that could use, may I say, less critical and more available waxes. The result is that perhaps some customers will be asked to take a wax that is more available and not as highly protective simply because his product doesn't need as much protection as was originally thought.

So by such a division of types of waxes with types of products, we believe that the tube industry will receive enough waxes for its purpose.

CHAIRMAN LYNCH: "Will standardization be extended in the glass field?"

DR. TOULOUSE: I do not believe that standardization will be extended very far. A few minutes ago there was a question on pharmaceuticals, and that is representative of one field that has not been forced into a standardized package. The possibility of such a requirement of course always exists. The industry that is required to use a standardized package will have to give up, as food and other industries already have given up, the versatility of the glass container in design. The glass industry itself is giving up similarly one of its chief differences in the versatility of design.

A possible pattern has been given by the recent addition of the particular types of bottles we call Boston Rounds. That is a simple round bottle, or an oblong bottle, and there are a few other standards which are not yet obligatory. That could be required, and there would be a pickup in the amount of bottles that could be made by the same machinery.

I am firmly of the opinion that many in industry would be without a package to take their goods to market if it had not been for the standardization that went through last year.

The drugs are largely in standardized containers already. Proprietary products and pharmaceuticals other than the drug industry as a whole are not in standardized containers. Some standardization might be done in the milk bottle field, although there is a fairly standard milk bottle. Nevertheless, the short-run proposition, that is the small orders, to take up considerable production time in the preparation period that precedes the manufacture itself.

So for that reason I say that standardization can be extended only a very little so far as gains are concerned, but I should not wonder but what the drug and cosmetic industry, drugs and proprietary products, medicines and the like and possibly cosmetics, would be the ones where standardization could be effected if WPB so considered.

CHAIRMAN LYNCH: That completes the questions that were written. We will be glad to answer any question from the floor that we are capable of answering.

MR. BURROUGHS, *Western Electric*: On the containers for re-use, second-hand containers, in connection with the label there has been a preparation which has been worked out which is something that you can put right on the container that will mark out the present label and you can get the name of the manufacturer by writing to Tomiska, at Washington.

In connection with this Monsanto Chemical Co. matter, on waterproofing with waxes, I don't know whether this will be of any interest or not on Army and Navy packages: we take the article and put it in a corrugated carton. That corrugated carton is wrapped in wax paper which in turn is dipped in wax, half at a time, and allowed to dry. That in turn is put into a fibreboard container and sealed with friction tape. That is one of the uses of a wax barrier that we have found to be very successful in the past.



FRIDAY AFTERNOON, November 5

Machinery and Production Round Table.—*Presiding:* WALLACE D. KIMBALL, 1st vice-president, *Standard-Knapp Corp.*, Portland, Conn. *Members of the panel:* JOHN W. HOOPER, vice-president, *American Machine & Foundry Co.*, Brooklyn; GEORGE A. MOHLMAN, president, *Package Machinery Co.*, Springfield, Mass.; DEXTER NORTH, chief, *War Production Section, Office of Alien Property Custodian, Washington.*

MR. HOOPER: As most of you may know by now, the Army has attempted to regularize the administration procedures involving the termination of Army contracts. To date I am not aware that any such procedure has been worked out by the Navy.

I believe they are conducting termination arrangements informally and entirely around the termination clause that they standardized on some 16 months ago which has been changed a number of times. So, our consideration today will resolve itself into a consideration of Procurement regulation No. 15, and the Accounting Manual the Army has gotten out.

Regulation PR-15 prescribes two modes of settlement. One is called the negotiated method and the other is called the formula method. In theory the negotiated settlement is one whereby the prime contractor and the contracting officer get together and agree on a settlement, on a basis perhaps not strictly related to cost or inventory.

In order to make clear just what I mean in the way of a negotiated settlement: you may be a contractor who does not operate on a particularly elaborate set of job costs or standard costs, and you might therefore find it very difficult to agree or to prepare the prescribed data that would enable you to set forth a claim for recovery based on inventory values or accumulated costs. Therefore, you go to the contracting officer and you say, "Here—our engineering records and our production records indicate that 60 per cent of the work has been completed. Therefore, we ought to get 60 per cent of the contract price." If the contractor can substantiate his 60 per cent by engineering evidence, that is satisfactory to the Army contracting officer.

You and I, however, as practical people, know that if we were in the shoes of the contracting officer, we would want as much bookkeeping, arithmetical computation as possible to satisfy you or me, as the contracting officer, that the engineer-

ing estimates were reliable in the face of the accumulated experience of the particular contractor on that contract or any similar contracts that might be used as a guide, or any similar previously performed contracts that might be used as a guide before passing final judgment.

Therefore, as a practical matter, I concede that the negotiated contract will simply resolve itself into the use of the formula method, whereby, in the long run, you will be called upon either to settle on an inventory basis or else to settle upon the basis of accumulated costs.

From the standpoint of the settlement of the contracts where termination has been ordered, the prime contractor deals directly with the Government, and the Government deals directly with the prime contractor only. There is no direct line from the Government to the subcontractor. Settlements are entirely between the prime contractor and the Government. However, this does not mean that the prime contractor is called upon to accumulate all of the claims of his subcontractors before receiving a settlement for his own expenditures or claims. The prime contractor may submit his claim independent of the subcontractors, and obtain settlement from the Government. However, in order to protect himself (I am talking now of the prime contractor) against his subcontractors, it behooves him to take immediate steps and intensive steps to get his subcontractors to file their claims through him as soon as possible, because if you do not do that you will have a contingent liability which is more than a contingent liability; it is a direct liability hanging over your heads as prime contractors, for all the period that the subcontractor will not have had his claim satisfied. There is nothing in the regulation so far, or in the contract clause, that specifies a time limit within which a subcontractor must file his claims.

Now, then, any payments to be made by the Government will pass through the prime contractor to the subcontractor. The subcontractor has no direct claim on the Government. The claim of the subcontractor is against the prime contractor. Therefore, if there is a question of the solvency of the prime contractor, an arrangement will be made whereby the Government will pay to the prime contractor, in trust for the subcontractor, a percentage of the claim of the subcontractor. That is provided for in PR-15. I am expressing a personal opinion now when I say that I very much doubt the ultimate effectiveness of that, because the subcontractor, along with other suppliers, is a general contractor, and in the absence of an assignment (which, incidentally, does not impair the rights of other creditors) I fail to see how a trust arrangement could be made that would stand up against the claims of other creditors. The only kind of assignment that would stand up would be in the case of a bank loan or an assignment at a time when it was definite that said assignment was not an act of bankruptcy. And how anyone in these days can tell whether we are bankrupt or not, I am sure I don't know.

Of course there is the practical consideration that the subcontractor may go to the Government and say, "Here—this fellow is not sound, and we want some money," and you might get together with a contracting officer and, by an exchange of checks, as it were, (a Government check to the prime contractor endorsed over then by him to the subcontractor) immediately pass the necessary funds to the subcontractor.

Nevertheless, the claim of the subcontractor is against the prime contractor, and that point should not be overlooked, because at no time in his claim directly against the Govern-

ment. The procedure outlined here is the correct one.

(Mr. Hooper then quoted at length from a speech given before the New York Credit Men's Assn. by Maj. Elbridge Stratton, Officer in Charge of Terminations, New York Ordnance District. A significant excerpt follows.)

"... a brief summary of the facts in connection with two claims which were actually settled in our district. Negotiated settlement was used in both cases. In the first case, the total cost basis was the method followed, and the second the inventory basis.

"The claim submitted on the total cost basis was in connection with a contract for the production of 2,350,000 units, total contract price \$718,000. The contract was partially terminated, and the number of units reduced from 2,350,000 to 109,000. Production had not been completed on 109,000 at the time of the partial termination, but was completed approximately six weeks later, and the contractor then submitted his claim.

"His total costs were \$74,200. He had received payment for the completed units, \$33,300. So there was a balance representing his claim of \$40,900, exclusive of profit allowance and exclusive of his subcontractors' claims, of which there were seven, totaling \$17,500. His costs were made up of direct costs consisting of labor, material, and factory overhead, and indirect costs, general administrative expenses, and office salaries.

"The costs were reviewed in our office, and an auditor was sent to the contractor's plant to review his cost records. As a result of this audit, certain items of cost, totaling \$6,400, appeared to us to be unjustified. These eliminations included certain administrative costs, and rent extending beyond the time of the termination of the contract. The other reductions were small and covered four or five other items.

"After giving effect to these reductions, to which the contractor agreed, his costs applicable to the terminated part of the contract were reduced from \$40,900 to \$34,500.

"In the contractor's original proposal, his breakdown of the unit price indicated a profit of 10 per cent, but it was agreed between him and our negotiator, on the basis of the record of performance of the contract to the date of termination, that he would not have realized a profit of more than 4 per cent, had the contract been completed. So the rate of 4 per cent was applied to the total costs, as adjusted, and after subtracting the amount which he had been paid on completed items, this left his claim of \$35,900. He did have certain materials on hand, which he offered to retain at a discount of approximately 25 per cent of their costs. We accepted this figure, and final settlement was reached with him at the figure of \$33,400.

"The subcontractors' claims, totaling \$17,500, were examined in our office. We made suggestions as to two or three of them to our prime contractor. He went back for some further negotiations with his subcontractors and a small adjustment of \$1,500 was made, so they were settled at a total of \$16,000."

A question was later asked at this meeting at which this talk was given with regard to what would happen in the case of a subcontractor's refusal to accept the write-down in his claim that was proposed to the prime contractor by the contracting officer, and it was said in no uncertain language that the final dealing was entirely between the subcontractor and the prime contractor, and that if the subcontractor once went to law on it in a suit against the prime contractor, the Army would acknowledge the judgment of the court. So it spells out very definitely the principle that even though the Army may recommend a write-down of your subcontractor's claims, the ultimate settlement of the claim of the subcontractor is between the subcontractor and the prime contractor, just as if the Government were not in it.

"During the period of negotiations, the contractor requested a partial payment. At that time we had received his claim, given it an office review, and were satisfied that he was at least entitled to \$20,000 payment, which we promptly made him. He in turn used this to pay off the balance of his bank loan, and it put him in a position to negotiate an entirely new bank loan in connection with another Government contract.

"Exactly three months elapsed between the filing of the contractor's claim and the approval of a negotiated settlement by our contracting officer."

I happen to know that they are doing their best to speed up settlements.

"Briefly, the facts in connection with the other claim, which was made on an inventory basis, covered a contract for the production of 1,200,000 units at a contract price of \$93,000. This contract was terminated to the extent of 44½ per cent. As soon as production was complete, the contractor was able to prepare his claim and file it, one month after that date.

"Computed on the inventory basis, his claim amounted to \$14,700, consisting of raw materials on hand, parts in process, commercial parts on hand and unamortized costs of various tools. The claim was reviewed in our office and an auditor was sent to the contractor's plant to make a selective audit, and the check completely substantiated the contractor's claim. He agreed to retain certain tools which were, of course, applied as a credit. We allowed him a profit allowance based on the indicated rate which he had made on the units produced and delivered. In this case a total period of two months and 24 days elapsed between the filing of the claim and the negotiated settlement.

"In some cases the period has been longer—considerably longer—than two months and 24 days or three months. In some cases it has been shorter. I think as contractors acquire greater familiarity with these procedures, and as we—the Government personnel—have more extended training, we hope to steadily reduce the average time."



CHAIRMAN KIMBALL: Are there any questions that you would like to ask Mr. Hooper?

Mr. FERVER, *Package Machinery Co.*: Are there any contracts now being negotiated with the Government which specifically state what the price will be for profit percentage that will be allowed on the uncompleted portion of the contract cancelled, and would it not be a good way to get around some of the difficulties?

MR. HOOPER: The Army is trying to obtain from prime contractors (and is pretty successful in doing it today) an estimate of the amount of profit included in the contract or in the estimate given for the job before the contract is closed. But I do not know of anything in any contract I have seen or heard of where a profit percentage is stipulated to be paid the contractor in the event the contract is terminated for any reason.

MR. MOHLMAN: I understand, John, that every contract has to stand on its own feet. It is not like renegotiation where they are all lumped together, but that every time you make a contract you still have to negotiate each one with the contracting officer. Is that right?

MR. HOOPER: That is correct.

MR. PAWLING, *The De Laval Separator Co.*: By what method can the so-called profit be applied to the uncompleted

portion of a contract when the completed unit is being sold at a loss?

MR. HOOPER: I think that right here, in the second case that I mentioned, it might be possible if you can get them to agree to it. But in the case that I cited here, where the contractor estimated originally a 10 per cent profit, in the final upshot of the case on termination, his records indicated he was only earning 4 per cent, and then he was only allowed his 4 per cent profit, and not what he originally estimated, namely, 10 per cent. So, if you apply that principle, I think you will know what your answer is.

That is why Mr. Mohlman pointed out that, unfortunately, contract termination and the negotiations that go along with it, are a one-way street. It just goes in one direction, and you do not have a chance to offset the traffic coming in the other direction.

MR. BARR: The questions that have been asked here indicate that there is some provision for the normal profit or the anticipated profit on the uncompleted part of a cancelled contract. It has been my understanding that there has been no allowance made for the profit that you would get on the uncompleted part of such a contract. Am I correct about that?

MR. HOOPER: You are correct in your understanding, Charlie. I have in my hand a booklet called "War Contract Termination Procedure"—as announced on September 1 by the War Department in Regulation 15, and parts of the "Termination Accounting Manual for Fixed Price Contracts." This also was published by the National Association of Credit Men, and I imagine you can obtain it easily enough by sending for it if you wish to have it.



CHAIRMAN KIMBALL: We wish to thank you, John, for your fine contribution.

In the next subject on our program for the afternoon we have another nut to crack—the re-negotiation of contracts, and in view of the fact that the president of your association, and also the president of the Packaging Machinery Corp. of Springfield, has been re-negotiated, we have asked him to tell us what he knows about the situation. Mr. George A. Mohlman.

MR. MOHLMAN: One of the important questions for business today is—shall we re-negotiate or not. Those who have decided that they don't want to will find, after considerable hesitation, that they must, or should, if they want to continue to do business with the Government. I quote a paragraph from the Under Secretary of the Navy's letter to the Lincoln Electric Co.

"If you wish to be heard with respect to the determination of excessive profits for your fiscal year ended December 31, 1942, please advise me not later than October 21, 1943. Otherwise, action will be taken to eliminate such excessive profits for your fiscal year ended December 31, 1942, by directing the withholding of payments otherwise due to you by the Government and by prime contractors with the Government."

This is technically legal, but is an example of the bureaucratic pressure which is going on, and under which we are living for the time being. It makes the department the final judge of what a profit should be without an appeal to some disinterested tribunal which would look at both sides dis-

passionately. Even a murderer is entitled to a jury trial. Furthermore, I do not believe that Congress will repeal the act, although it may organize a joint board, or at least have standard rules of the game.

Our first direct contract with the Army was made at a price set by another contractor. We beat his costs so much that we would voluntarily have returned some of the profit without re-negotiation, if we had known whom to pay it to. No one would take the money.

The point is, though, that when we were taken to the cleaners, the penalty for cutting costs was much greater on us than on the original contractor. This leads me to wonder if efficiency and proper shop methods are worth as much in war work as they are in peace times.

The case of our company is probably typical of those who have gone through the wringer. When our local committee from the Ordnance Department first came to us, and said that they had been authorized to open re-negotiation proceedings with us, we were glad to see them, admitted that we probably had made too much money by accepting someone else's prices for the machines we were told to build and told the board to go ahead and figure out what they thought we should pay, and we would abide by their decision. In a few weeks they came back and submitted a figure, and we told them that we would certainly stand by what we had said, and accepted the amount that they recommended we pay without question.

That was in October, 1942, and at that time, we and the local board were given to understand that the local committee had full authority to make such agreements, and that the War Department in Washington would only interfere in cases of fraud or other criminal practices.

Four months after this signed agreement, the local board was told by Washington that they had been too liberal, but would not give any figure which they thought would be satisfactory. We felt that not only we, but the local board, had been double-crossed somewhere along the line, and simply let the matter rest.

As the result of the delay in the approval of the local board's findings, we were not able to present a clean financial statement to our stockholders, and we were forced to hold up many necessary State and Federal Government certificates, reports and other papers.

Finally, in September of this year, Washington was persuaded to set a figure at which they would close the deal, and this we accepted, and the matter is now history. The basis of settlement was a little over 15 per cent on adjusted sales, and was fair enough, in view of the tendency to settle between 10 per cent and 18 per cent.

If re-negotiation is to continue, I approve of the re-figuring of prices of such settlements by local boards, because they know the type and condition of the businesses in their area, their history and their prospects for postwar business. For example: the board felt that an old-line pistol and revolver manufacturer in the area simply existed between wars, and should be allowed to keep enough of a reserve to help keep him in business until he might be needed again. This is, perhaps, an extreme case, but does illustrate the usefulness of local decisions.

In ordinary business practice, a concern estimates on a job and figures overhead, taxes, etc., in its costs. These are all known factors. Re-negotiation is another form of taxation, but the company quoting has no way of knowing what that tax will be. For that reason, the tendency is to figure high and if they don't get the business, there are always other war

jobs. On the other hand, if you lose money on your contract, there is no redress or recovery.

After all, what business wants is not a large profit now, but enough reserve with which to continue business after the war, and Section 403 could be amended to allow as a cost of production, a reasonable charge for reserves for postwar conversion. If some clear law were enacted by Congress, which would insure that, the terrors of re-negotiation would be much less and settlements would be made with less delay. What the business man fears today is the unknown, whether it is the definition and amount of excess profits or what. We, as business men, want to know and should be told what is going to be left in the pool after we have turned over our facilities, honestly and sincerely, to the production of materials for war. At present, we are all in the race, but are not even running on the same racetrack.

Unless the matter of re-negotiation is left in local hands, it might be a good idea to have the Internal Revenue Department do the work in connection with their tax returns. They would certainly be able to quickly screen out all concerns which were obviously not subject to re-negotiation and would be in a much better position to decide on the amounts that should be re-paid, because they would have the financial history of the company involved, for years back, to compare with present earnings.

This method would take a heavy load off management and would return just as much revenue to the departments involved without the tremendous expense of the many re-negotiating bureaus which have been set up throughout the country. I doubt very much that the Government could show a profit on the re-negotiated business they recover if the difference between that amount and the taxes collected by the Revenue Department were the only yardstick they could use to go by.

Perhaps at some later date this group might care to take some action on re-negotiation or make some recommendations to our political leaders.



W. D. Kimball

CHAIRMAN KIMBALL: Are there any questions you wish to ask Mr. Mohlman?

MR. BARR: I want to ask Mr. Mohlman this question: did you say that the percentage of profit that was allowed on your re-negotiated sales was about 15 per cent?

MR. MOHLMAN: Yes.

MR. BARR: Before taxes, of course?

MR. MOHLMAN: Yes, before taxes—adjusted sales.

MR. BARR: It is very surprising the widespread difference in the percentages that are apparently allowed. We have heard that they vary all the way from 6½ per cent up to 18 per cent.

MR. MOHLMAN: It is all over the lot—and it is a good deal a matter of horse trading with the powers that be. Most of our industries represented here must and do operate on a large percentage of profit. We have to in order to stay in business and to keep our customers provided with the sort of things they want through the appropriation of certain of our profits to experimental work and that sort of thing. I believe that was taken into consideration in our case. I think an appeal you could all profitably make, if you come up for re-negotiation, is that we are in a specialized industry which does need a large profit in order to keep going and to keep our customers happy.

MR. BROWNE, *The De Laval Separator Co.*: I would like to ask this question: is it true that the Lincoln Electric Co. profits are in the neighborhood of 2 per cent?

MR. MOHLMAN: If you are talking about the Lincoln Electric Co. which I quoted here, I am not familiar with it and don't know.

MR. HOOPER: I understand that the Lincoln Co. has just gone to court to serve an injunction on the War Department to prevent the War Department from deferring or withholding payments to the Lincoln Electric Co. under the award of \$3,200,000. That was recently indicated by the Under Secretary of War as the amount that the War Department would expect from the Lincoln Co. and they have gone into court seeking an injunction. That is the first test case and I recommend that you all follow it. I am sorry I don't have the percentages in mind, but I think we all owe it to ourselves as a duty to follow that case.



MR. BECKER, *Peters Machinery Co.*: Apropos of Mr. Mohlman's remarks about the peculiar type of business most of us are in, I would say that the five-year period on which they base their conclusions is very important—that is, the audit for five years from 1939 back to 1934 or '35, and that is the basis on which we made up our recommendation for a percentage, because we showed a certain percentage of profit over that five-year period. I believe that is very important and is applicable mostly to this machinery manufacturers group.

MR. HOOPER: George suggested that we all ought to get after our representatives and see if they could not do something about this Re-negotiation Act. At the present time, Wesley Disney of the Ways and Means Committee has been chairmaning a subcommittee of the Ways and Means Committee with a view to drawing up a bill for modifying the Re-negotiation Act so that you should direct your attention, if you are going to take any political action at all, to the activity of that subcommittee and the bill that is now before the House Ways and Means Committee. It is important, if you want something done, that you express yourselves now, because the public hearings are all over. Now is the time for you to take action.

MR. MOHLMAN: Yes, that is quite true. I think we should do it at once, because the hearings are over and the conclusions will come out very shortly. Any pressure we can put on the Ways and Means Committee or our own Representatives should be done right away.

CHAIRMAN KIMBALL: I think we ought to use what influence we can in this matter. It is something that is very important.

MR. STOKES, *Stokes & Smith*: I am wondering whether we as a group cannot send a telegram to Washington on this. Wouldn't our collective strength be better than our doing it each one as a separate individual? There is not very much time to act.

MR. MOHLMAN: That is what I had in mind in the last paragraph of my remarks. I am glad Mr. Stokes has brought it up. I think this Machinery Institute is strong and powerful enough and well enough known to make such a telegram worth while. I would like to hear someone make a resolution which would be appropriate.

Mr. STOKES: I would like to offer such a resolution.

Mr. MOHLMAN: What form shall we put it in? Do you want to work it out?

Mr. STOKES: I would be very happy to leave it in your hands, sir.

Mr. MOHLMAN: We shall do what we can, then, on it.

Mr. STOKES: I so move.

Mr. BARR: I second the motion.

CHAIRMAN KIMBALL: It has been moved and seconded that an appropriate telegram or letter be sent to the proper parties in Washington relative to this matter and that the wording thereof be left to Mr. George Mohlman. All those in favor will please signify by saying "Aye." Contrary-minded? It is carried and so ordered.

Mr. HOOPER: May I make a suggestion there, too? At the present time, termination, as we know, is being taken care of by the Army only on single contracts. I think the association ought to take some steps to get itself on record with respect to the need for over-all termination and the need for one body—the same as we are trying to work toward one body on re-negotiation.

CHAIRMAN KIMBALL: Doesn't that require additional action—taking the matter up with the War Department in addition to the Ways and Means Committee?

Mr. HOOPER: No. There are hearings going on today on the subject of termination with the idea in mind of enacting a new bill that will allow financing of prime contractors on termination, including a provision for an over-all hearing body and over-all hearing regulations. That along with the other matter ought to be addressed to the Ways and Means Committee.

CHAIRMAN KIMBALL: George, you are the president of this outfit now. We will let you wrestle with this problem.

Mr. MOHLMAN: We will work it out.

CHAIRMAN KIMBALL: Are you satisfied, then, to have John Hooper and George Mohlman work that out whichever way they see fit and send proper communications to the proper people?

(Common consent was given by those present.)



I want to call your attention to something that may or may not be of interest to you. That has to do with the foreign patents held by the Alien Property Custodian. In connection with that subject we have been successful in inducing Mr. Dexter North to come here this afternoon and tell us something about these alien patents.

Mr. NORTH: I am very happy to have this opportunity to come here to talk to you about the subject of enemy patents for the reason that we are confident they will play an important role in the transition period from a war to a civilian economy and I suppose many of you are now thinking of the postwar period.

The Alien Property Custodian has seized approximately 45,000 patents and patent applications of enemy aliens and nationals of occupied countries, of which over two-thirds are enemy. Their average remaining life is estimated to be 7 or 8 years. These patents constitute about one-sixteenth of all unexpired United States patents so the Alien Property Custodian controls the largest number of patents in the United States. They cover inventions in nearly every field and represent millions of man-hours of research and the expenditure of many millions of dollars. The inventions represent some

of the finest foreign research achievements, particularly in dyes, plastics, pharmaceuticals, rayon, alloys and electronics. A goodly number relate to packages and packaging machinery, of which I shall speak in more detail later.

A series of digests, describing alien patents of particular interest to the packaging field, prepared by Harold A. Levey, will be presented in the forthcoming January issue of MODERN PACKAGING.

On specific instructions from the President, the enemy patents will neither be returned to their former owners, nor sold. The patents formerly belonging to nationals of occupied countries are being administered by the Custodian not only for the benefit of the people of the United States but also for their former owners who cannot under present conditions manage them.

The patent licensing policy of the Alien Property Custodian is directed towards two main objectives—winning the war, and the permanent enlargement of our national production in the postwar period. To obtain the maximum effectiveness of this program, the following licensing conditions were decided upon:

1. Under enemy patents and patent applications not exclusively licensed prior to vesting, licenses will be non-exclusive, royalty-free for the life of the patents. Previously outstanding licenses will not be disturbed where American interests exist, unless necessary for the war effort.
2. Under patents and patent applications belonging to nationals of enemy-occupied countries, not already exclusively licensed, non-exclusive licenses will be granted for the life of the patent. When no license is already outstanding, new licenses will be royalty-free for the duration of the war and six months thereafter, and then subject to reasonable royalties. When non-exclusive royalty-bearing licenses are already in effect, new licenses will carry, for the life of the patent, the same royalty terms as the licenses already outstanding.
3. Existing exclusive licensees under vested enemy patents have the option of exchanging their royalty-bearing exclusive licenses for non-exclusive royalty-free licenses, but otherwise these licenses will be maintained except where the public interest or the needs of the licensee may require the revision of agreements.
4. Each licensee, unless operating upon a war secrecy agreement, will report periodically to the Custodian on the extent of his use of the patent.
5. The Custodian reserves the right to revoke a license. In the absence of express Congressional authority, the Government does not appear to have the power to dispose of property on royalty-free terms except with provision for recapture when in the public interest. No reasons are apparent, in the absence of misconduct on the part of the licensee, why licenses should be revoked.

We have not yet issued licenses on patents of nationals of occupied countries, a subject on which we are consulting with the State Department acting on behalf of the governments-in-exile. Satisfactory clearing of this situation is anticipated in the near future.

I have already pointed out that we are recognizing previously outstanding exclusive licenses. In order to ascertain which patents were so licensed the Custodian issued a general order requiring all licensees under vested patents to report the facts in the case and other pertinent information. Our licensees are assured that the patents under which they are operating are unencumbered with prior claims, and if this position is challenged in the courts, the Custodian has arranged with the Department of Justice for the defense of the licensees at any future time.

You will be interested to learn of the progress of our licens-

ing program. As of October 20, the number of license applications received was 615, involving 8643 patents, and the number of licenses issued was 269, involving 1153 patents, both patent figures being net after elimination of duplicates.

We are under no illusions that this is a great achievement, but are aware that considerable time and research are often necessary to prove a patent and that our industries are too busy with war contracts to give thought to new products or new processes. We have just initiated intensive efforts to bring these patents to the attention of small industries of the country.

I have with me a supply of our Index of patents vested in the Alien property Custodian. This Index shows the number of patents which the Custodian holds, grouped according to some 300 Patent Office classes. You will find there numerous classes relating to packaging machinery and packages. I have some mimeographed lists of the more important classes. From the index sheet you can order from our Chicago office those sections or classes of the catalog of patents which interest you. The catalog lists the title, number, class and sub-class of each patent. From these lists I have selected at random a few titles of patents which might be of interest to some of you who are connected with the packaging industry as follows:

- Closing of tins.
- Packing of ground coffee.
- Sealing bottles, jars and other receptacles.
- Bottle closure.
- Egg-carrying device.
- Drum.
- Cask.
- Method of reinforcing the walls of packing cases.
- Folding box.
- Dispensing and closing device for tablets.
- Sanitary toothbrush container.
- Cosmetic holding device.
- Device for drilling, filling and sealing hollow bodies.
- Device for wrapping irregularly shaped objects.
- Paper roll wrapping machine.
- Machine for labeling and wrapping.
- Automatic coin counting and wrapping machine.
- Device for closing filled bags.



The next step is to examine the actual patents and patent applications, copies of which may be purchased from the Patent Office in Washington, inspected in our patent libraries at our Chicago, New York or Washington offices, or at any of the 17 depository public libraries receiving copies of United States patents. Members of our staff at these offices will be glad to be of assistance to you in examination of our patent holdings.

Incidentally we have made available printed specifications of vested pending patent applications, which are obtained in the same manner and for the same price as copies of patents. They represent the latest inventions of our enemies and the countries dominated by them. This is the first time that printed specifications of a large number of pending United States patent applications have ever been made available to the public.

Once you have selected a patent, follow the simple instructions for obtaining a license as shown in our catalog. A li-

cense application fee of \$15 is charged for each patent, payable at the time of filing the application.

It is a challenge to American industry to put these vested patents to active use. Failure to use them must not delay our war production or conversion to peace-time pursuits. The Custodian's office stands ready to help you use these patents to their fullest extent.

CHAIRMAN KIMBALL: In order to save time and in order to direct the questions which we would like to put to Mr. North, I have asked the assistance of a very good friend of mine, Mr. W. Brown Morton, a partner in Penny, Davis, Marvin & Edwards, and who is also my patent attorney. Mr. Morton will direct questions which are pertinent to this problem to Mr. North and will lead our discussion.

MR. MORTON: I would like to ask Mr. North first: is there any procedure by which a license can be obtained under the patents which are owned by corporations in this country which have been taken over by the Alien Property Custodian?

MR. NORTH: Yes, a certain number of them. Generally speaking, we have not vested the patents owned by corporations which we have taken over. We are operating those corporations as going concerns and their patents, accordingly, are worth money. We hope they are. But under the general broad policies laid down by the Custodian, those patents which they are not interested in exploiting themselves are being laid over to non-exclusive license on royalty-bearing terms. One company already has published a list of patents that they are willing to license. I refer to the Schilling Corporation, which is a chemical company. The largest company which we have vested, the General Aniline and Chemical Corp., which purchased about five thousand patents in 1940 from the German I.G. and G.A.F., is now in the process of evaluating those patents to determine which ones they want to exploit themselves and which ones they will be willing to license.

MR. MORTON: Will those lists be published?

MR. NORTH: The Schilling Corporation published their list and sent it, I believe, to the Patent Bar Association. I assume other companies will do likewise.

MR. MORTON: Is there any procedure by which an exclusive license can be obtained under any of the enemy patents which you have seized if the proposed licensee is contemplating making a substantial investment in going ahead under the seized patent?

MR. NORTH: So far, the answer is no. We have had requests for exclusive licenses, but it has been our experience to date that either they finally have been willing to take non-exclusive licenses or others have come forward and taken non-exclusive licenses. There might be certain conditions under which we would consider limited exclusive licenses. In the case of a war item, we will say, where the applicant cannot very well see his way to recouping the development cost (this is entirely in the talk stage now) we might consider not granting an additional license until the original licensee has absorbed the development cost. Or, another alternative would be that any additional licensees would share in this development cost until such time as the development costs are absorbed. Each case will have to be decided on its merits.

MR. MORTON: And no case of that kind has actually come up as yet?

MR. NORTH: No.

MR. MORTON: I wish you would tell us, Mr. North, something about the obligation that the licensee assumes under the licenses (the standard form) which are already issued.

MR. NORTH: Do you refer to the reporting requirements?

Mr. MORTON: That, and any other obligations they may assume.

Mr. NORTH: The reporting requirements are very simple, and are not onerous. A licensee is asked to report annually on his production under a patent. He may not have produced at all; in which case all he has to say is "No production." Some companies have taken out patents merely to safeguard their patent position. Then he is also asked to report whether he is conducting research.

Mr. MORTON: Is anything being done to abstract the subject matter of patents so that the prospective licensee can get a better idea of the patents than merely from the titles?

Mr. NORTH: Yes. I am glad to say that is being done for the chemical and process industry patents, which total nearly 8,000. The Chicago section of the American Chemical Society has volunteered to do this work and has appointed a committee of nearly 250 men to make these abstracts. They have completed their job and these abstracts are now in the process of being edited, indexed and grouped according to fields of interest.

Beginning in January, we hope the first of the new volumes will come out and that the job will be completed in February. There will be a total of 31 or 32 volumes, each with about 900 abstracts, or an average of 150 words each. This will serve as a very useful short-cut tool in the searches for inventions in particular fields.

Now, on the non-chemical patents, we are discussing the desirability of reproducing in printed form the drawing and the claim which is contained in the Official Gazette of the United States Patent Office. That will be the work of some 36 volumes and we are now sending out a letter to see how much demand there might be for such a work.



Mr. MORTON: Please tell us the advantages of taking out the non-exclusive license which you are now offering, over just going ahead and using the subject matter of the seized patent without that formality.

Mr. NORTH: That is a question that is most frequently asked, probably. In the first place, the license fee is only \$15. It is true that a company will hesitate to operate under one of these patents, non-exclusively licensed, if it had to make a large investment in plant and equipment. But do not forget that any improvements he may work out belong to him and not to any licensee, and that should be a great incentive to obtain one of our licenses. Furthermore, most patents are improving patents, anyway, and a great many of the enemy patents certainly are subject to improvements by Yankee ingenuity.

CHAIRMAN KIMBALL: There were some questions handed in, of which this is one: "Will the seized Italian patents be returned?"

Mr. NORTH: So far as we know, there will be no change in our treatment of Italian patents.

CHAIRMAN KIMBALL: Another question: "What incentive is there for a manufacturer to secure a license from the Alien Property Custodian and make a substantial investment of plant and equipment if the license can be revoked at some future time?"

Mr. NORTH: In the first place, the Government does not license any of its property in perpetuity, a position for which ample legal precedents can be cited. For instance, a railroad may want to put a bridge over a river; but the Government

does not give them perpetual right to maintain that bridge. It may be necessary, in the national interest, to remove or change that bridge some day. But a patent has only a life of 17 years. So we are now discussing the possibility of offering an irrevocable license, except for cause, which would have the life of the patent only, and it is possible we may be able to get around that Government ruling.

I have had it told me that one reason for that revocation clause is for use as a bargaining point at the peace table. I can truthfully say this: that I have inquired about that and I have never found any hint that such was the purpose in back of this controversial clause.



CHAIRMAN KIMBALL: Brown Morton asked you this question and for purposes of the record I will read it: "Instead of obtaining a license on a seized patent, what is to prevent a manufacturer from utilizing the disclosures in the patent without a license?"

Mr. NORTH: I don't think I fully answered that. In the first place, the taking out of a license shows the licensee that the Alien Property Custodian, through the Department of Justice, will defend him against any damage suits or infringement suit by the Alien Property Custodian, and possibly a damage or infringement suit brought against him by the former alien owner.

CHAIRMAN KIMBALL: I wonder if this question is not asked a good many times: "What incentive is there to obtain a non-exclusive license if competitors can also obtain the same license?"

Mr. NORTH: I have already answered that but I might add another point: that exclusive licenses tend to channelize research. The Custodian wants the widest possible use made of these patents. Furthermore, an invention may have applications in another not readily discernible field. So that we want as much as possible, to use the technique of one industry in other industries.

CHAIRMAN KIMBALL: Are there any questions from the floor?

Mr. REBNER, *Hotel Research Laboratories*: Will the Custodian defend actions in infringement suits also when brought in foreign countries, in connection with export business?

Mr. NORTH: No, I assume not, since the United States patent offers protection only in the United States, not in foreign countries.

Mr. NORDQUIST, *American Type Founders*: Did I understand that if you took a license, you would not be subject to any suits for infringement after the war was over, by the original holder of the patent, in the event something like that came to pass?

Mr. NORTH: I would not say that. The Custodian will undertake to defend the license.

Mr. NORDQUIST: The Alien Property Custodian will defend any suits, then?

Mr. NORTH: Yes.

Mr. JOHNSON: Who pays the damages growing out of such a suit?

Mr. NORTH: The Alien Property Custodian.

CHAIRMAN KIMBALL: If there is no further business to come before us during this session I will declare the meeting adjourned.

(Adjournment was thereupon taken at 4:30 P. M.)



WASHINGTON REVIEW

by R. L. Van Boskirk

● **L-232 Amended**—Amendment to Limitation Order L-232 issued November 10, 1943, by the WPB Containers Division postpones until January 1, 1944, the prohibition against the packing of fresh vegetables in new wooden shipping containers to permit growers to use this type of container for shipping fresh vegetables which will be picked during the balance of the year. Shippers of the vegetables added to the prohibited list by another amendment to L-232 issued October 25 may for a period of 60 days use any new wooden shipping containers that were in inventory or in transit on October 25, 1943, the amendment says.

In addition, the newer amendment establishes restrictions as to the use of wooden shipping containers on a quarterly rather than a yearly basis.

The lumber required for boxing and crating currently represents about 40 per cent of total lumber production. Because of the critical supply situation on lumber, veneer and plywood, which are used in the manufacture of wooden containers, the Containers Division has had to take drastic steps to make sure that expanding military requirements are met. The amendment issued on October 25 was designed to save annually approximately 170,000,000 board feet of wood that otherwise would be used for containers.

This amendment prohibited the use of wooden containers for the shipment of a large number of products which can be shipped satisfactorily in other types of containers which are not so critical as wood. These include certain building materials, a number of food items, some fresh vegetables and a number of other miscellaneous products. The order permitted wooden containers to a limited extent for a number of items which cannot be satisfactorily shipped in other type containers. These items, shipments of which are restricted by quotas based on a percentage of 1942 shipments, are the following fruits and vegetables: radishes and cucumbers, 50 per cent; cantaloupes and melons, cauliflower, celery and lettuce, 80 per cent. Carrot shipments may be made at 100 per cent of the 1942 figure. Miscellaneous products such as books, carpets, clothing, glass tableware and kitchenware, and linoleum and rugs are given an 80 per cent quota. Animal

proprietary drug remedies and furniture other than for outdoor and garden use are given a 65 per cent wooden box quota.

● **Paper and Paperboard Production Reserves**—Conservation Order M-241 has been amended by WPB to revise the industry's production reserve of paper and paperboard tonnage, particularly as it affects filling Governmental orders and to simplify and clarify paper and paperboard procurement.

Reserve production requirements were changed to permit WPB to direct delivery of as much as 10 per cent of a paper mill's production in any month. The new amendment makes it possible in the future to modify the percentage as a whole or by paper grades or grade groups and thus makes the reserve production only as large as is needed to meet war needs. Any paper or paperboard manufacturer who voluntarily schedules a recognized governmental order and reports it to WPB on the form indicated will receive credit against his reserve or withheld production.

The amendment also provides that paper and paperboard inventories are limited in total rather than by grades as in the past. Manufacturers of folding and set-up boxes and paper shipping sacks may carry a 60-day total inventory.

● **No Lipsticks in Steel Cases**—Rumors that steel may be released for lipstick cases and vanities are without foundation. An amendment to Conservation Order M-126 (Iron and Steel) would be necessary to release steel for this purpose and no such amendment is being considered at the present time. According to a WPB official, a hardship appeal might release a small amount of steel for lipsticks and vanities. The only other possibility, however, would arise if some one had frozen blackplate or carbon steel that couldn't be used for more essential purposes and then found a processor in a non-critical area. This possibility is still remote.

● **Glass Container Order Revised**—An amendment to Supplementary Order L-103-b issued November 1 by the Containers Division of WPB makes minor revisions of new glass container quotas.

The expiration date of the Order L-103-b has been extended to December 31, 1943,

by which time it is expected a permanent order covering glass containers can be issued. Adjustments in methods of computing quotas have been made to adapt them to the new 6-month quota period (July 1–December 31, 1943) instead of the old 4-month period (July 1–October 31, 1943). In addition to regular quotas, a commercial user may borrow during the month of December, 1943, an additional $\frac{1}{6}$ of his quota, not to be used prior to January 1, 1944. As amended, the order now controls only glass containers of less than 2-gal. capacity instead of the former 5-gal. limit.

The maximum exemption figure for small users of glass containers has been raised from \$1,000 to \$1,500 worth of empty new containers during the 6-month period ending December 31, 1943.

Quotas of glass containers authorized for packing coffee have been maintained at 75 per cent with adjustments to allow increased acceptance during the winter months.

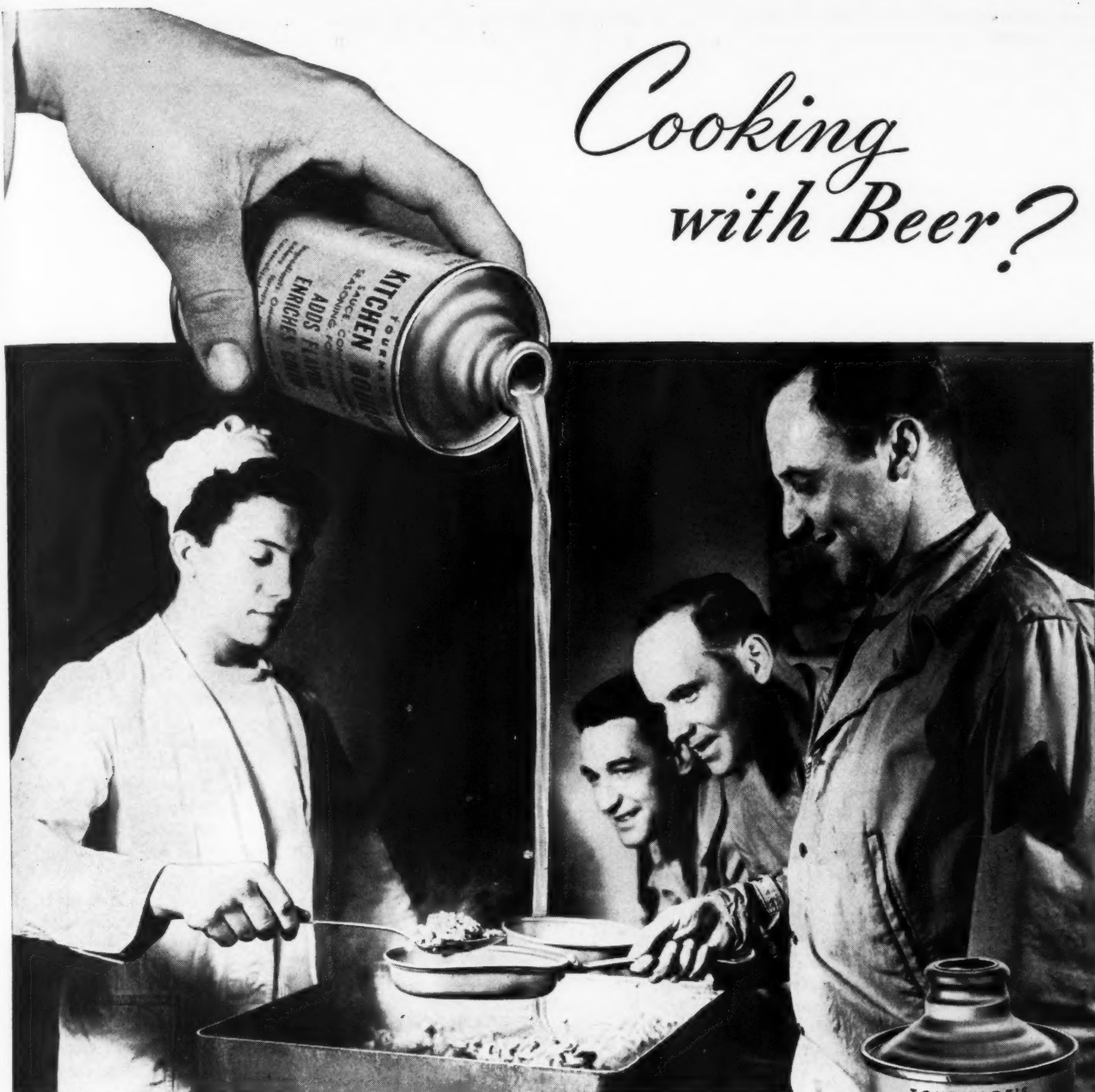
The filing of a one-time certificate when purchases of new glass containers are made is now required. The purchaser must state that he is familiar with supplementary Order L-103-b and that he will not accept containers in violation of the order.

● **Restrictions of Tinplate, Terneplate and Tin Mill Blackplate Clarified**—Supplementary Order M-21-e, as amended, was issued by WPB November 9, 1943, to clarify restrictions on tinplate, terne plate and tin mill blackplate. Under the order it is permissible to recoat material in a number of applications and thus salvage misprinted or rusty material. Minimum practicable coatings in excess of 1.25 lbs. per base box for hot dipped tin plates, in gauges heavier than 112 pounds per base box, are permitted.

Tin- or terneplate coated with less tin than specified in Schedule A for any permitted use is specifically allowed in the amended order. The provision restricting use of tin to the quarterly quota assigned by WPB is removed. Since production is now restricted by production directives, this provision was unnecessary.

● **L-83 Amended**—Amendment to L-83 (Industrial Machinery) issued November 4, 1943, permits the renewal of leases of

Cooking with Beer?



Well, the can does look familiar! But the product *isn't* . . . unless you're versed in the culinary art!

It's a Crown fabricated type beer can all right! But this time it contains Tournade's Kitchen Bouquet especially packed for the use of our overseas forces.

This concentrated sauce has long been popular with army cooks as well as with civilian chefs for flavoring and enriching gravies, stews and soups . . . so Crown was called upon

to furnish a container that would assure its safe transportation to kitchens set up in the combat zones.

So the Crown fabricated type beer can took on the job . . . not in its regular line of duty . . . but in a special wartime capacity . . . another demonstration of Crown's ingenuity in meeting military demands!

CROWN CAN COMPANY, New York • Philadelphia. Division of Crown Cork and Seal Company, Baltimore, Md.



CROWN CAN

any kind of packaging or labeling machinery without application to WPB for approval or for new ratings, if the original lease or any prior renewal has been approved under this Limitation Order and the machinery is still being used for the purpose approved. This amendment applies to certain types of packaging and labeling equipment used for can closing which are customarily leased rather than sold outright.

Packaging and labeling machinery which is sold outright is covered by General Limitation Order L-83 only on an order for a single machine of a value in excess of \$200.

● **WPB Establishes Quotas for Canning Machinery**—WPB has announced quotas establishing the quantities of more than 150 specified types of canning machinery and equipment that may be manufactured during the year beginning October 1, 1943, through issuance of Schedule III of Order L-292 (Food Processing Machinery). Prior to the issuance of this schedule, production of canning machinery was limited to 50 per cent of the annual average number of units produced during 1939-41.

WPB may increase or decrease any quota or transfer any portion of it from one manufacturer to others, should there be need to do so.

● **Recent Changes in M-81**—Conservation Order M-81 (Containers) as amended by WPB October 23, 1943, removes limitations on the pack of grapefruit juice for the 1943-44 season and limits packs for other citrus products to the quantities to be set aside for governmental agencies under Food Distribution Order No. 22. The order as amended permits the use of No. 2 cans for packing spinach and other green leafy vegetables, increases packing quotas for paints from 55 per cent to 65 per cent of the 1942 pack, increases the packing quota for printing inks by 10 per cent and reinstates shoe polish in the order with the 1943 packing quota fixed at 100 per cent of 1942.

● **Specialty Paperboard Industry Advisory Committee Appointed**—Twelve business men representing the various segments of the specialty paperboard industry have been appointed to an industry advisory committee by OPA to advise and consult with OPA on problems affecting the specialty paperboard group of manufacturers who are subject to Appendix C of Revised Price Schedule No. 32 (Paperboard Sold East of the Rocky Mountains).

Members of the Committee are: Kendall Wyman, Champion Paper & Fibre Co., Hamilton, Ohio; A. K. Nicholson, Hollingsworth & Vose Co., East Walpole, Mass.; Joseph Auchter, Cherry River Paper Co., Camden, N. J.; T. Stewart Foster, Foster Paper Co., Inc., Utica,

N. Y.; C. A. Goodrich, Case Brothers, Inc., Manchester, Conn.; Cecil M. Pike, Spaulding Fibre Co., North Rochester, N. H.; W. S. Gamble, Brownville Board Co., Brownville, N. Y.; F. Henry Savage, International Paper Co., New York City; Malcolm B. Lowe, Lowe Paper Co., Ridgefield, N. J.; J. B. Cowie, Hollingsworth & Whitney Co., Boston, Mass.; John A. Dodd, The Davey Co., Jersey City, N. J.; Walter B. Sheehan, Missisquoi Corp., Sheldon Springs, Vt.

● **L-317 Interpreted**—The following interpretation has been issued with respect to Limitation Order L-317 which limits the manufacture and use of fibre containers.

The restrictions of L-317 are applicable only to new fibre shipping containers. A question has arisen about the status of such containers which have been rejected during the course of manufacture or upon delivery because of errors in size, printing, etc. Such containers are new containers and subject to the restrictions contained in the order until they have been used for the packing of a product.

● **Wet-Strength Paper Markings Required**—Limitation Order L-279 (Paper Shipping Sacks) has been amended and clarified to make it more practicable and workable in view of the present paper shortage, according to J. F. Zeller, Chief of the Paper and Textile Bag Section of WPB Containers Division.

Wet strength paper markings have been defined in order to identify this type of paper and aid in sorting papers in salvage work. After December 1, 1943 all wet-strength paper used in the manufacture of single wall, duplex and multiwall paper shipping sacks must be distinctly colored, stained or printed or marked with longitudinal stripes. No other grade of paper used in the manufacture of such shipping sacks may be so marked.

● **Stocks of Cork**—Stocks of cork in the United States are more than sufficient to meet current requirements; therefore it is felt that a portion of government stocks should be liquidated through industry channels. This situation was revealed at a recent meeting of the Cork Industry Advisory Committee, when a program, which may forecast methods employed in the liquidation of other war inventories, was developed.

● **Paperboard Ceilings Increased**—Amendment 7 to RPS 32 (Paperboard Sold East of the Rocky Mountains) was issued October 29, 1943, by OPA as part of a joint program with WPB to encourage the production of the lower-priced grades of paperboard made primarily from wastepaper. Paperboard ceilings at the manufacturer's level have been increased on nine different items for a limited period. By limitation and allocation orders, WPB also will facilitate a shift in production to lower-priced grades.

The increases became effective November 4, 1943, and will remain in effect through January 14, 1944. The following day the former ceilings will again apply unless OPA orders otherwise.

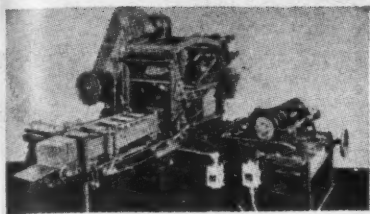
Another move to increase supplies for the manufacture of paper boxes, boards and other critically needed shipping materials is the three-point attack, designed to break a serious black market in wastepaper, which has been outlined jointly by C. E. Wilson, Acting Chairman of WPB, and Chester Bowles, General Manager of OPA.

Key points of the joint program: (1) OPA ceiling prices on wastepaper will remain unchanged. Dealers and suppliers cannot benefit by holding off supplies awaiting higher prices. (2) Special OPA investigators have been assigned in the drive against any wastepaper handlers who violate wartime price ceilings. Simultaneously, WPB is considering directives or other controls on the distribution of wastepaper to help wipe out the black market by channeling wastepaper into areas where the need is the greatest. (3) A paper salvage campaign is being undertaken by WPB.

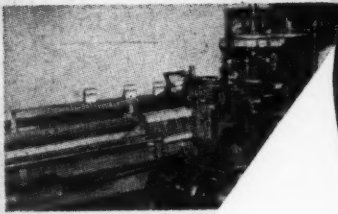
● **Paper from Bananas in Palestine**—According to the Department of Commerce, a new mill in Palestine is manufacturing a common paperboard from cotton waste, pulp from banana and orange peels and leaves of banana trees. A second new mill is producing wrapping paper from the papyrus plant and a "brown leather board" from leather clippings.

● **New Prices for Staves, Headings and Barrels**—MPR 481 (Knife-cut Slack Staves, Slack Heading and Slack Cooperage) has been issued by OPA to provide a schedule of new prices for knife-cut slack barrel staves, heading and finished slack barrels. Because of increased production costs, the new ceilings are approximately 15 to 20 per cent higher than those previously provided by the GMPR under which the items were priced. The new ceilings are retroactive to April 10, 1943. The industry since that date has been operating on an open billing basis, pending issuance of the present regulation.

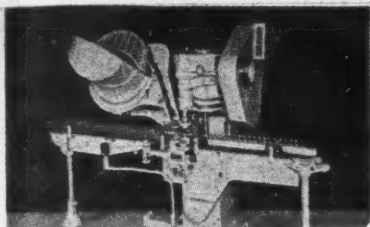
● **Production of Zein Increased**—During the six months that zein has been under allocation, production has been more than doubled, and further increases are anticipated soon. Zein is an alcohol-soluble protein obtained as a by-product of cornstarch manufacture and raw material for its production is available in very large quantities. As a shellac substitute in commercial use it is combined with other resinous materials and each pound replaces two or three pounds of shellac. Some experiments have indicated that for certain uses this substitute is superior to natural shellac.



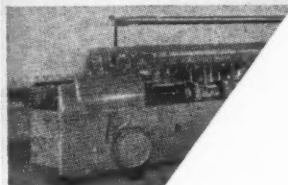
Tight Wrapper—Glues entire inside surface of wrapper to insure strong, airtight, insect-proof package. Other machines for handling waxed one-side wrappers.



Carton Feeder and Bottomer—More efficient than a dozen different methods of tucking the bottoms.



Single Head Cutter—one of several different models designed to handle even the most delicate caps without breakage or scratching.



Hi-Speed Duplex—Packs various other most boxes and jars.

*In back
of Pneumatic's
slogan...*

LOWER COST PER CONTAINER"

More than eighty major packaging and bottling machines back up Pneumatic's continued assertion of "lower cost per container." Take the leading manufacturers of packaged goods in the food field for example. There, a wide variety of Pneumatic equipment is daily delivering packaged foods with speed, smoothness, and dependability.

Today, in designing and building machines for producing ordnance, Pneumatic engineers have discovered important new facts about design and method. This means that after the war Pneumatic Packaging and Bottling Machines will be even better equipped to lower the cost per container.

As in peace times, we continue to advise with authority on adapting packaging equipment to

your particular needs—engineering the machine and suiting it to the product in question.

We are now under the pressure of delivering essential war goods. Nevertheless, we have made provision in our production schedule to continue to give your orders for essential new equipment and parts the prompt and careful attention they deserve.

Pneumatic Scale Corporation, Ltd., 71 Newport Avenue, North Quincy, Mass. Branch Offices: New York, Chicago, San Francisco, Los Angeles.

PNEUMATIC
PACKAGING & BOTTLING MACHINERY

U. S. patent digest

This digest includes each month the more important patents which are of interest to those who are concerned with packaging materials. Copies of patents are available from the U. S. Patent Office, Washington, at ten cents each in currency, money order or certified check; postage stamps are not accepted.

ENVELOPE. P. E. Georgiou, Salt Lake City, Utah. U. S. 2,330,045, Sept. 21. An envelope of symmetrical shape comprising a front portion, a sealing flap along the upper edge, and narrow front flaps of equal area extending away and along substantially the full length of the opposite lateral edges of front portion.

CONTAINER. J. C. van Cleef (to Gaylord Container Corp., St. Louis, Mo.). U. S. 2,330,093, Sept. 21. A carton with a tray member and a cover member telescoped over said tray member.

DISPENSING BOX. E. M. Feinberg (to Precious Metals Research Works, Inc., New York, N. Y.). U. S. 2,330,117, Sept. 21. A box of folded material, and adapted to rotatively support a roll of foil, paper or the like mounted upon a cylindrical shaft, which shaft extends beyond each end of the roll.

PAPER BALER. T. E. Wykes, Grand Rapids, Mich. U. S. 2,330,165, Sept. 21. A construction including a carton having a bottom, vertical sides, upper end closing flaps adapted to extend vertically from the sides of the carton, said carton being adapted to receive material to be compressed therein.

MACHINE FOR MAKING AND PACKING CIGARETTES, D. W. Molins (to Molins Machine Co., Ltd., Deptford, London, England). U. S. 2,330,000, Sept. 21. A combined cigarette-making and packing machine, comprising in combination a cigarette-making unit and a packing-unit.

DISPENSING DEVICE. J. T. Bell and C. E. Scarcist, Alliance, Ohio. U. S. 2,329,689, Sept. 21. A receptacle having a cap with a delivery opening, an ejector movable toward and from the opening, and mechanism operable from the top of the cap for shifting said ejector.

SEMICARTON. J. F. Ames, Selma, Alabama. U. S. 2,330,255, Sept. 28. A bellows-type bag having integral bottom, front, rear and side portions with bottom portion lying in a flat plane, and other portions extending vertically.

PACKAGE. S. I. Darrow (to Beech-Nut Packing Co., Canajohari, N. Y.). U. S. 2,330,691, Sept. 28. A package

having a wrapper that is wrapped about the longitudinal surface of the package with its edge portions overlapping and its ends folded over the ends of the package.

CIGARETTE PACKAGE. F. A. Wodal and J. J. Wodal, West Collingswood, N. J. U. S. 2,330,772, Sept. 28. A cigarette package rectangular in form of two-ply material, one of said plies being a straight continuous line of perforations adjacent and paralleling one of the longer edges of said blank, and provided with a pull tab.

PACKING BOX AND LINING THEREFOR. C. A. Biggs, Burlington, Ontario, Canada. U. S. 2,330,262, Sept. 28. A box lining blank formed of a single piece of cardboard or similar material scored to form a bottom, sides, corner pieces between adjacent sides.

CONTAINER. J. P. H. Leavitt and E. W. Wells (to Container Corp. of America, Chicago, Ill.). U. S. 2,330,294, Sept. 28. A container formed of flexible sheet material having four interconnected side walls, adapted to be collapsed to a flat condition.

PACKAGE. C. I. Elliot (to Radio Corp. of America, a corporation of Delaware). U. S. 2,330,345, Sept. 28. A one-piece tray made of foldable sheet material and comprising a rectangular support platform having an odd number and at least three rows of holes parallel to the sides of said platform.

CARTON. C. I. Elliot (to Radio Corp. of America). U. S. 2,330,346, Sept. 28. A container for fragile articles comprising an outer tubular box, an inner article-supporting cradle comprising two pairs of flat, thin straps of a width less than the depth of said box.

SHIPPING CONTAINER. C. I. Elliot (to Radio Corp. of America). U. S. 2,330,347, Sept. 28. A container of paperboard for packing fragile articles comprising a rectangular outer container.

PACKAGE. C. I. Elliot (to Radio Corp. of America). U. S. 2,330,348, Sept. 28. A package comprising an inner container having four rectangular side panels, an outer container having four rectangular

side panels, said containers having end flaps, and means for resiliently but firmly spacing the inner container from the sides and ends of the outer container.

DISPENSING RECEPTACLE. H. C. Atterbury (to Atlantic Carton Corp., Norwich, Conn.). U. S. 2,330,464, Sept. 28. A dispensing receptacle with side, end and bottom wall members forming a receptacle and upper, outer and inner secured together, end members closing said receptacle, the inner member having a trapezoidal-shaped opening with a rear end adjacent to the rear side of the receptacle, and equipped with a spout forming member.

COMBINED MAILING WRAPPER AND COVER FOR MAGAZINES AND THE LIKE. H. C. Pomeranz, New York, N. Y. U. S. 2,330,619, Sept. 28. A combined cover and mailing wrapper for a magazine book, and the like of a readily foldable material.

QUICK-OPENING ENVELOPE. E. B. Berkowitz (to Berkowitz Envelope Co., Kansas City, Mo.). U. S. 2,330,666, Sept. 28. A quick-opening envelope formed of fibrous material including a body portion and a seal flap portion.

METHOD OF, AND APPARATUS FOR, PRODUCING BAGS. S. R. Howard (to Pneumatic Scale Co., Ltd., Quincy, Mass.). U. S. 2,330,361, Sept. 28. Method of making individual filled bags; steps comprise forming bag, filling and sealing on one apparatus.

FLUID DISPENSING MEANS. R. T. Parker, Cleveland Heights, Ohio. U. S. 2,330,616, Sept. 28. Apparatus for filling a substantially airtight container having an opening through which liquid may be admitted.

WRAPPER FEED FOR WRAPPING MACHINES. W. Hoppe (to National Bread Wrapping Machine Co., Springfield, Mass.). U. S. 2,330,715, Sept. 28. A wrapping machine having a carrier movable between loading and discharge stations.

COLLAPSIBLE CONTAINER AND METHOD OF PRODUCING IT. L. B. Pierce, Winthrop, Mass. U. S. 2,330,311, Sept. 28. Producing collapsible containers by making a bag in the form, and having the characteristics, of a conventional paper bag.

BAG. S. P. Cerf and E. W. Cerf, University City, Mo. U. S. 2,331,536, Oct. 12. Means for restoring to an initial datum capacity a used bag composed of walls of paper or the like.

MERRY XMAS
MR. SLOWEY

THANKS, CANDY,
AND A MERRY XMAS
TO YOU, TOO

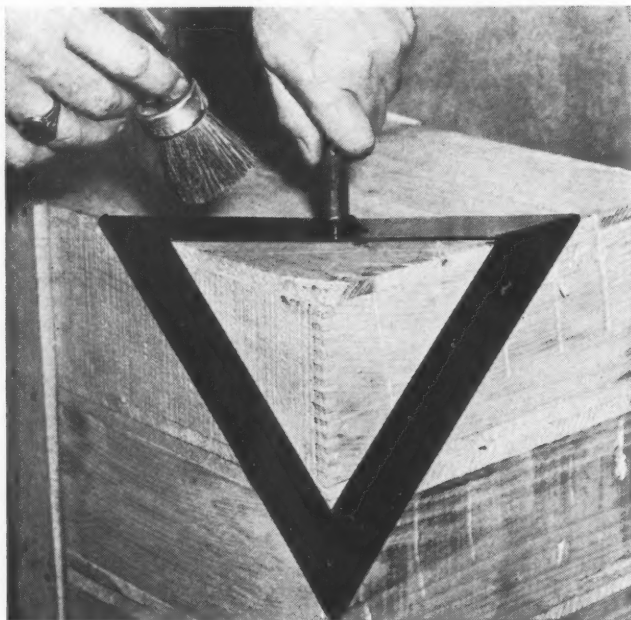


*And the Season's Greetings to all you people who sent me your excess bottles and bottle caps. You certainly made possible a Merry Christmas to a good many people whose businesses depended on filling bottles, and who had no means of obtaining any except from people like you with excess merchandise to dispose of. You also made it a very Merry Christmas to many sick people who went to hospitals to get medicine through the dispensaries. These dispensaries were also caught short on bottles, and you helped relieve the shortage. Let us continue making people happy this coming year by disposing of your excess merchandise in this manner. * We will continue to buy any odd; discontinued or obsolete bottles or bottle caps, either metal or bakelite, plain or lithographed, regardless of size or quantities. In fact, any kind of containers, including paper or metal cans, compacts and lipsticks. * Let us know what you have to dispose of and we shall contact you immediately.*

Glass Container & Cap Outlet Co.

14 East 17th Street * New York, N. Y.

Equipment and Materials



TIME-SAVING BOX CORNER STENCIL

The sales department of H. G. Hanline Co., Philadelphia, has developed a box corner stencil which is said to save two-thirds in man-power time. The stencil is of 16-gauge steel, 2 in. wide and is made to stencil a distance of 5 in. in each of three directions from the corner of a packing case. It is equipped with a handle and weighs $1\frac{1}{4}$ lbs.

WEATHERPROOF ADHESIVE

The Grasselli chemicals department of E. I. du Pont de Nemours & Co., Inc., has introduced a weatherproof adhesive (Dupont 77) for use in the production of V-1, V-2 and V-3 weatherproof board. (See pages 100-104.) The product is sold as a dry powder in 50-lb. paper bags and is said to require only simple mixing equipment to produce stable solutions ready for use. The Grasselli chemicals department is offering technical assistance to fibre-box producers in adapting its new adhesive to their "V" box production problems.

ASPHALT TESTING

An asphalt-testing department for determining the suitability of various grades of asphalt used in the manufacture of weatherproof boxes has been installed by Container Testing Laboratories, Inc., New York.

This new department was prompted by the order requiring the use of asphalt in the manufacture of V-boxes. This confronted many box makers with the problem of working with a material with whose properties they are unfamiliar. Quality of asphalt has been found to vary considerably from shipment to shipment. Such variations often require changes in the operation of the combiner or laminator. For example, a change in viscosity is said to require a corresponding change in running temperature in order to keep the same spread.

Because few boxmakers are equipped to make their own control tests, the Container Testing Laboratories have provided an independent agency for testing several of the more important properties of asphalt, including penetration at various tempera-

tures, flash point, fire point, Furol viscosity, solubility and softening point and other factors involving asphalt.

NEW WRAPPING FOR STEEL PARTS

Angier Corp., Framingham, Mass. announces a new oil-impregnated crepe wrap for wrapping metal parts. The paper is said to be flexible enough to conform to protruding parts of odd-shaped articles without puncturing or tearing and to be shock absorbing.

IMPROVED BAG CLOSER

Union Special Machine Co., Chicago, announced a new column type bag closer that accommodates all types of this company's sewing heads. Depending on the sewing head used the closer produces (1) bound-over tape closure for all sizes of multiwall bags, (2) straight-sewed closures for all sizes of cloth or paper bags, (3) double-tape sewed closures for paper bags up to 10 lbs. It is available in either the single-thread chain stitch type for easy raveling or the two-thread, double-locked stitch type for extra strong closures.

SYNTHETIC RUBBER CONVEYOR BELT

The Goodyear Tire & Rubber Co. has announced the development of a new synthetic rubber conveyor belt which they claim compares favorably with prewar high quality belts. According to W. C. Winings, manager of Goodyear's mechanical goods division, the new belt not only matches its predecessor in flex life, aging and resistance to abrasion, and cutting but it also resists oil and high temperatures.

DEMAND FOR POSTWAR MACHINES

George A. Mohlman, president of the Packaging Machinery Co. foresees a great replacement demand for wrapping machines in the postwar era. "The majority of machines now in operation, even if they do not need replacement, will at least need complete overhauling," he said. "With proper care the average life of a packaging machine is 10 to 15 years. Some have been running for 30 years and most have received only about 10 per cent of normal maintenance."

LIQUID CHEMICAL FOR TAPE SEALING

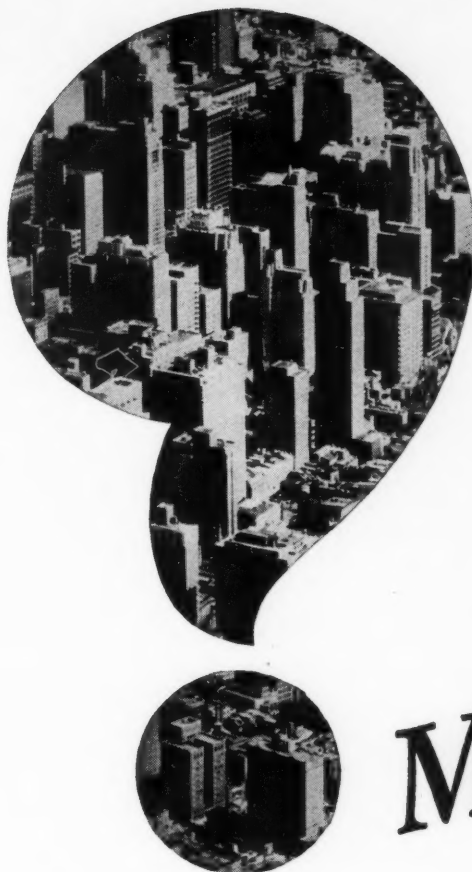
A new liquid chemical to dissolve glue on sealing tape has been announced by Seal, Inc., Shelton, Conn. The company claims that the liquid will cut sealing time in half. It dissolves the glue on the tape in the few moments it takes the tape to pass from the machine to the carton. The shipping clerk merely has to place the tape on the carton.

BOOKLET ON STAINLESS STEEL

The Jessop Steel Co. of Washington, Pa., have just published a new booklet on stainless steel which they claim to be of special interest to fabricators contemplating the use of composite metal. There are sections on deep drawing, grinding, polishing, cleaning, gas-cutting, riveting, soldering, welding, etc. Copies are available on request to the company.

ADDENDUM—In the November issue, the small printing press illustrated in Fig. 7, Page 84, is manufactured by the Markem Machine Co., Keene, N. H.

Whose



Market?

THERE is no such thing as a market that favors either buyer or seller exclusively...it favors both or none.

When the buying end of business cannot get raw materials, manpower, containers, or whatever is necessary for the production of finished goods, the selling end cannot make shipments to customers on schedule.

It takes both buyers and sellers to make a business, and *teamwork* to make a success of it. So...let's not delude ourselves that these difficult times are a paradise for so-called "sellers." We are all confronted with identical problems and we will have to work them out together. *Together*, we can work them out best.

Note Our
New
Address!

NATIONAL ADHESIVES

DIVISION OF
NATIONAL STARCH PRODUCTS INC.

270 MADISON AVENUE, NEW YORK 16, N. Y.

CHICAGO

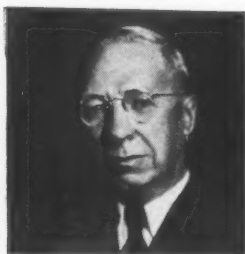
— PHILADELPHIA

— BOSTON

— INDIANAPOLIS

— SAN FRANCISCO

Plants and People



H. H. Leonard

Herbert H. Leonard, long identified with packaging machinery activities and now president of the Consolidated Packaging Machinery Co., has been elected to the presidency of the American Machine & Foundry Co., New York. He says this is not to be interpreted that he is leaving the packaging field, which means much to him. Later, an announcement will be made regarding his affiliation with the Consolidated Packaging Machinery Co. and the official personnel of that company. Mr. Leonard was president of the Packaging Machinery Manufacturers Institute for a number of years.

King Pedlar, advertising manager of Einson-Freeman Co., has left to join the U. S. Army Air Forces. He will be succeeded by Ben Dreyfuss.

Gene Reichert replaces A. J. Lyons as manager of the glass and closure division and industrial division creative section of the advertising and promotion department of the Armstrong Cork Co. He will also continue to handle the advertising of the industrial division. William Lamb has been named assistant manager in charge of glass and closure division advertising.

Herman R. Thies has been appointed manager of the Good-year Tire & Rubber Co.'s new plastics and chemical sales division at Akron, according to R. S. Wilson, vice-president. Robert D. Vickers, research and sales engineer from the company's laboratory staff, R. S. Sanders and Eileen Marshall will also be members of the new division.

T. R. Baxter has been appointed manager of packaging and the packaging development department of Standard Brands, Inc., according to an announcement made by James S. Adams, president. He will consult with the research, new products, sales, manufacturing and engineering departments on changes in packaging equipment or design.

Emory J. Price is now industry manager for milling and cereal industries in the newly established Minneapolis branch office of the Reynolds Metals Co., Richmond, Va. Mr. Price will co-operate in postwar packaging research for these industries. He has had many years of experience in the milling industry and was with the Pillsbury Flour Mills Co., Minneapolis.

The Package Machinery Co., Springfield, Mass., was awarded the Army-Navy "E" on November 3 with George A. Mohlman, president accepting the award for more than 600 workers.

Robertson Paper Box Co., Inc., Montville, Conn. recently received the Treasury Star—the highest award of the Treasury Department—in recognition of their employees' attainment of the cash quota for the purchase of War Bonds through the Payroll Deduction Plan, and for investing more than 10 per cent of their gross earnings in War Bonds.

The Gair Old Timers Assn., founded in 1933 in memory of Robert Gair by those who had worked for him or his company, Robert Gair Co., Inc., for a number of years, held its Eleventh Annual Banquet, October 23 at the Hotel New Yorker. Frank E. Forsbrey, assistant vice-president and general manager, Paper Division of the Pulp & Paper Trading Co., New York, was

elected president of the association for 1943-1944, succeeding Charles F. Stocker, president of the Sweeney Lithograph Co.

A history of the Association, together with its ideals and objectives was published in booklet form and distributed to members and historical libraries. It is interesting to note that the founder established his business as a paper jobber only 60 days after the conclusion of the Civil War.

G. A. Gustafson has been named manufacturing manager of the plastics divisions of General Electric's appliance and merchandise department it has been announced by W. H. Milton, Jr., manager of the division. Mr. Gustafson's new headquarters are at 1 Plastics Ave., Pittsfield, Mass. The company has also appointed F. W. Warner as assistant engineer, plastics division.

Removals: Elmer E. Mills Corp. to 153 West Huron St., Chicago 10, Ill. Standard-Knapp Corp.'s Chicago Office to 221 No. LaSalle St., Chicago 1, Ill. Pacific Fine Arts and Pacific Label Co. to 1231 South Main Street, Los Angeles 15, Calif.

William H. Weintraub & Co., Inc. has been appointed by Anchor-Hocking Glass Corp. as its advertising agency for radio. A coast-to-coast program will be broadcast over Columbia network starting sometime in January.

Enid Edson is the new director of packaging for Richard Hudnut. Mrs. Edson has been in the industrial designing field for many years, the last ten of which were in the cosmetics field. She studied at both the New England School of Design and the Rhode Island School of Design to prepare for her career as an industrial designer, particularly of packages.



Enid Edson

Robert S. Solinsky has resigned his position as Chief of the Metal Can and Tube Section, WPB, a post he has held since the early days of the Containers Division. Mr. Solinsky is president of Cans, Inc., Chicago.

The Comstock Canning Corp., Newark, N. Y., is first food processing company to receive the "A" award, War Food Administration's recognition of "achievement." Richard E. Comstock, president, accepted the award for all six plants.

Paul A. Parker, manager, corrugated carton division, Anchor Hocking Glass Corp., has been granted a leave of absence to serve as chief consultant of the Paper Board Division of the Office of Civilian Requirements. He assumed these new duties November 16.

OBITUARY

C. C. Van Stray, eastern sales engineer for the Cameron Machine Co., Brooklyn, N. Y., died at his home in West New York, N. J., October 14. Mr. Van Stray was known by paper mill officials all along the East Coast south of New York in which territory he represented the Cameron Machine Co. for almost 15 years.

Louis S. Reynal, former President of The American Paper Goods Co., died on October 18. Mr. Reynal was the chairman of the board of directors up to the day of his death and he was well known and loved throughout the industry.

George E. Senseney, 69, president of the Marvellum Co., Holyoke, Mass., died November 18 at his home in Ipswich, Mass., after a long illness. Mr. Senseney was born in Wheeling, W. Va. He was known widely in the paper industry, but was also internationally recognized as an etcher.



Treat for two!

The distinctive flavor of Bowey's famous DARI-RICH chocolate syrup has been enjoyed by soda and sundae-loving Americans for almost a decade.

Bowey's, Inc., has manufactured for nearly half a century a full line of high quality Chocolate Products, Fruits, Fruit Syrups, Vanillas, Flavors, Extracts, Colors, etc.

DARI-RICH chocolate is just one of the many Bowey's products that are protected with Crown Screw Caps—available in a wide variety of types and sizes for all kinds of glass packed products.

CROWN CORK & SEAL COMPANY
World's Largest Makers of Closures for Glass Containers
BALTIMORE, MARYLAND

CROWN CLOSURES

CROWN'S WARTIME POLICY: To supply closures, containers and services for packaging foods, beverages, chemicals, etc., needed by civilians and the armed forces. To build an ever-increasing volume of vitally needed weapons of war for our fighting men.

For Your Information

NAVY CALLS FOR PACKAGE EXPERTS

Men with packaging experience who can qualify as officers are needed by the Navy in connection with a special program. These officers will be assigned to the Containers Section of various Bureaus for service at shore establishments. Applicants must have a college degree and at least three years' experience in the packaging or packing field or two years of satisfactory college work and five years' experience.

The age bracket is 28 to 48 years. Applicants must meet Naval physical requirements and possess officer-like qualities. Applications should be made at the nearest Office of Naval Officer Procurement. These offices are located in principal cities throughout the United States.

To fill a vital packaging job Joel Y. Lund, president of Packaging Institute, Inc., calls on the packaging industry in a letter to members as follows:

"We have been requested by the United States Army to bring to your attention the fact that they are establishing in the Washington area a laboratory equipped for package testing.

"At the present time they have not as yet decided upon a director for this laboratory. With the realization of the tremendous importance of the laboratory to the industry, they have requested us to advise all of our membership that the position is still open, and that they earnestly request all of us to suggest qualified candidates. Their reason, very simply, is that from past experience they know that industry wishes men in these key governmental positions to be high calibre, capable men. Through the medium of the Institute, they wish to call upon industry to take part in choosing and in finding the best man for the job."

WPB's "Salvage Manual for Industry," the first comprehensive manual on industrial salvage ever prepared has been completed by an editorial board of seven practical industrial salvage engineers and business paper editors. This 250-page book, published by the Technical Service Section, Salvage Division, WPB, contains instructions regarding efficient salvage methods and practices for segregating and preparing secondary waste materials. WPB claims that putting the information in the manual to work in a well-organized salvage program will not only conserve valuable war materials but also will result in more efficient plant operations with substantial savings after the war.

Copies are procurable for 50 cents through Superintendent of Documents, Government Printing Office, Washington, D. C.

Roth F. Herrlinger, President of the Gummed Products Co., Troy, Ohio, was again named president of the Gummed Industries Assn. at the annual meeting in Cleveland. John McLaurin, president of the McLaurin-Jones Co., Brookfield, Mass., was named vice-president. Philip O. Deitsch was appointed managing director of the association and the following directors were chosen: E. J. Durkin, The Tanglefoot Co., Grand Rapids, Mich.; R. A. Maish, Dennison Mfg. Co., Framingham, Mass.; Wm. Mazer, Hudson Pulp & Paper Corp., New York; Irving McHenry, Mid-States Gummed Paper Co., Chicago; F. A. O'Neill, Jr., Paper Manufacturers Co., Inc., Philadelphia.

One of the highlights of the meeting was when Herbert T. Holbrook of the Packaging Section of the Ordnance Department outlined some of the obligations to be imposed on the industry in the use of its new waterproof paper sealing tape. Later in the program Messrs. Hrubesky and Spinar of the Forest Products Laboratory discussed the technical obligations that will be im-

posed upon this new product. The convention authorized its committee of technicians to meet with representatives of the Forest Products Laboratory and Dr. B. W. Scribner of the Bureau of Standards to perfect a tentative specification covering this new product. In a specially prepared paper, C. W. Boyce, special assistant to the director of the paper division of the WPB, outlined the extremely critical pulp situation and urged the industry to continue its conspicuous record of cooperation in dealing with this particularly difficult situation.

Thousands of British school children gave up their summer holiday to work instead for the Royal Army Ordnance Corps, helping to pack and send vital supplies to the British armies all over the world. In the depots of the R.A.O.C. these boys and girls worked voluntarily and without pay counting, packing and stenciling stores for shipment. When they started working they were carefully supervised by R.A.O.C. personnel and those in charge claim that the children handled thousands of tons of shipping a week.

To cut down absenteeism, the American Can Co.'s Amertorp plant has designed an Employees Service Bureau. According to Carl G. Preis, vice-president of the company, the bureau is operated by three-full time clerks who are war-working wives, under the supervision of Vincent T. Day, assistant to the industrial relations manager. Among the services which the bureau provides are: handling gasoline and special mileage applications; purchase of new automobiles, bicycles, tires, tubes, etc., listing of rooms, apartments and houses; the purchase of war bonds, automobile licenses and tickets for social functions.

The National Adhesives Division of National Starch Products, Inc., has prepared a two-color mailing piece which shows how to make metal drums last longer and which urges the trade to return empties (barrels too) promptly. Its title is "Ever Been Beaten By a Drum?"

The food processing industry, with a minimum reconversion problem in prospect, can look forward to an orderly readjustment to a peacetime economy, with probability of broadened volume to sustain the peak production volume attained under the war program. This was the general feeling expressed at war conference sessions of Grocery Manufacturers of America. Current postwar planning, it was said, includes provision for the introduction of numerous new products and packages at the termination of hostilities. It was added that while the termination of government contracts will slow down operations for a brief time, the changeover to outright production of civilian lines will require only a brief transitory period.

A new and enlarged edition of the Canned Food Reference Manual has just been published by the American Can Co. The revised edition presents the latest knowledge concerning containers for commercially canned foods and commercial canning technology, together with recent phases of wartime research in food, it is said. Prepared and edited by member of the Canco research department the new handbook contains 106 illustrations, 65 of them new and 552 pages of textual matter covering the story of tin can making from the Napoleonic wars to the present.

Multiwall bags for dehydrated molasses—Due to shortage of tanker facilities in the Caribbean, some 275,000,000 gallons of molasses in Cuba, Puerto Rico, Virgin Islands and other West Indies Ports cannot be exported. This is a serious economic problem in the islands which are almost entirely dependent upon sugar product exports and also curtails to the United States a



Advance!

ON the world's far-flung battle fronts, our fighting men are carrying out that stirring command—"Advance!" Their courageous deeds are writing a glorious page in history. And helping them to write that history—to keep strong in body—to combat sickness and disease—are collapsible tubes.

These small tubes whose peacetime duties have been devoted largely to such products as tooth paste, shaving cream and powders are now doing scores of vital jobs for our armed forces.

Collapsible tubes hold emergency rations... sulfa drugs... pyrotechnics and many other wartime products. And to provide them Sun Tube is busily at work.

In addition, Sun Tubes are being used more and more for domestic products. Sun Tubes are sturdy and durable, perfect protection against dirt and germs. They are the ideal containers for dozens of everyday products.

If your product needs a container such as Sun Tube offers, we'll be glad to give you details. Just call or write our nearest office for details.

SUN TUBE CORPORATION . . . Hillside, New Jersey

CHICAGO, ILL.
James L. Coffield, Jr.
360 No. Michigan Avenue

ST. LOUIS, MO.
M. P. Yates
315 Chestnut St. (Room 125)

ST. PAUL, MINN.
Alexander Seymour
903 Pioneer Bldg.

LOS ANGELES, CALIF.
R. G. F. Byington
1260 North Western Ave.

critical import needed for the distillation of alcohol for munitions and other commercial alcohol uses such as cattle feed.

As a wartime expedient the Board of Economic Warfare has developed a process for dehydrating and packaging molasses, with the idea of making possible the movement of molasses in greater volume to the States. In this form, it is said, molasses can be shipped in freighters in 40 per cent less space than fluid molasses.

Packaging tests of the dehydrated blocks in multiwall paper bags have been conducted at the University of Louisiana, Baton Rouge, by BEW and Union Bag and Paper Co. Experiments included bags of various types and number of plies subjected to conditions approximating those of actual handling and shipping. Since this, actual test shipments are being made. Results are expected to provide data with regard to performance and costs to show whether this project with the equipment, labor and packaging materials involved can be feasibly done. Some sugar people argue that it can never be done at a cost comparable with that of pouring the molasses into tankers at a loading point and syphoning it out at its port of destination. On the other hand, if the molasses must be moved, this may be the way, regardless of cost.

American Iron and Steel Institute has issued a 180-page manual, "Packaging, Marking and Loading Methods for Steel Products for Overseas Shipment." The manual is the culmination of an intensive three-year study of methods in preparing steel products for overseas shipment in wartime. It contains instructions approved by the Army, Navy and other government agencies for wrapping, tying, marking and loading of steel products. In preparing the instructions, many consultations were held with purchasing missions representing the British Empire, China, U.S.S.R., the Fighting French and others.

Twenty-five awards for coffee, tea, spice, condiment and flavor containers entered in the Seventh Annual Packaging Show conducted by The Spice Mill, were announced at the National Coffee Assn. Convention at French Lick, Ind.

Awards were made largely upon consumer appeal, wartime availability and utility. Entries this year continued to show marked improvement in design, informative labeling, color and other qualities regarded as essentials for consumer appeal. No single "top" award was made for the entire show. Each of the 25 blue ribbons was for outstanding merit in a particular classification. Consideration was also paid to the kind of performance in wartime markets each entry might be expected to give.

Serving as judges for the Seventh Spice Mill Packaging Show were: Arthur S. Allen, designer; Agnes Adams, food editor, *New York Post*; and, Lester J. Loh, art director, J. M. Mathes, Inc. Following is a list of the blue ribbon winners:

- Bag*—Parker House Coffee. Banker Coffee Corp. Bag by Benj. C. Betner Co.
- Quality Appeal (Bag)*—Choisia Coffee. S. S. Pierce Co. Bag by Benj. C. Betner Co.
- Display Value (Bag)*—Stewarts Private Blend Coffee. Stewart Ashby Coffee Co. Bag by Thomas M. Royal & Co.
- Informative Labeling (Bag)*—Richelieu Coffee. Sprague Warner-Kenny Corp. Bag by Benj. C. Betner Co. Designed by Howard List, Sprague, Warner & Co.
- Brand Identification (Bag)*—Red Head Coffee. Banker Coffee Corp. Bag by Union Bag & Paper Corp.
- Double Purpose Bag*—Emmrich Coffee. Emmrich Coffee Co., Inc. Bag by Thomas M. Royal & Co.
- Kraft Bag*—Arabian Coffee. Arabian Coffee Co. Bag by Benj. C. Betner Co.
- Hotel Bag*—M-C Coffee. Majestic Coffee Mills. Bag by Benj. C. Betner Co.
- Carton*—Holland House Coffee. Holland House Coffee & Tea Corp. Carton by Robert Gair Co., Inc.
- Carton (Tea)*—Mayfair Tea. The Great Atlantic & Pacific Tea Co. Carton by Robert Gair Co., Inc.
- Carton (Tea Bags)*—Royal Scarlet Tea Bags. R. C. Williams & Co. Carton by Rossoti Lithographing Co., Inc.

Carton (Spices)—Pickling Spice. National Tea Co. Carton by American Coating Mills, Inc.

Carton (Dehydrated Foods)—Soup Mixes. Stahl-Meyer, Inc. Carton by American Coating Mills, Inc.

Carton (Family Group)—"Mc" Spices. McCormick Sales Co. Cartons for Whole Spices by Guilford Folding Box Co. Designed by James Harley Nash.

Carton Can—Parker House Coffee. Banker Coffee Corp. Carton Can by American Can Co.

Carton Can (Quality Appeal—Limited Market)—Medaglia D'Oro Caffè. S. A. Schonbrunn & Co., Inc. Carton Can by American Can Co. Label designed by H. S. Fromme.

Can (Spices)—Pepper. A. Schilling & Co. Can by American Can Co.

Can (Family Group)—"Mc" Spices. McCormick Sales Co. Cans for Ground Spices by American Can Co. Designed by James Harley Nash.

Glass—Del Monte Coffee. California Packing Corp. Jar by Owens-Illinois Glass Co. Caps and "Cel-O-Seal" Bands by E. I. DuPont de Nemours & Co., Inc.

Glass (Quality Appeal)—Flame Room Coffee. McGarvey Coffee Co. Jar and Cap by Owens-Illinois Glass Co. Seal by The Celon Co. Label Design by Art Gruber, Jensen Printing Co.

Glass (Condiments)—Glass Top Prepared Mustard. Plochman & Harrison. Jar by Hazel-Atlas Glass Co. Closure by Trio Metal Cap Co. Label by Abbott Way Printing Co.

Glass (Family Group)—M M & R Flavors. Magnus, Mabee & Reynard, Inc. Bottles by Fairmount Glass Works. Embossed Corks by Armstrong Cork Co. Labels by Columbia Lithographic Co. Glassine Paper by Deerfield Glassine Paper Co. Design by J. B. Magnus, Vice-president M M & R, Inc.

Combination Family Group—Coffee, Tea, Tea bags, Rice. Arnold & Aborn. Coffee Cartons by Brooks & Porter. Tea and Rice Cartons by Acme Folding Box Co.

Envelope—Morton Salt. Morton Salt Co. Envelope by Amsco Packaging Machinery Co. Packed by Neostyle, Inc.

Bulk Package—Sterling Salt. International Salt Co. "Bagpak" by Bagpak, Inc. International Paper Products Division, International Paper Co.

Eagle Printing Co., division of General Printing Ink Corp., has issued its thirteenth folder in the color facts series. This latest folder, titled "More Illusions and Facts About Color" contains several demonstrations of visual phenomena. Copies can be had by writing the company, 100 Sixth Ave., New York.

The Lamson Corp., Syracuse, N. Y. have published a booklet entitled "Simpson's Revised Methods of Wrapping & Packing" in the interest of paper conservation in store operation. The booklet lists groups of merchandise along with the former cost for wrapping and the present cost and it tells how the saving was achieved. Copies can be had from C. S. Jennings, sales promotion manager of the company.

Gordon Dilno, advertising manager of the Sutherland Paper Co., Kalamazoo, Mich., is chairman of the Kalamazoo Waste Paper Conservation Committee. According to Mr. Dilno his community has been doing such an excellent salvage job that nearby communities have asked for an outline of the collection method used. The outline is now available in printed form and can be had upon request from Mr. Dilno by writing him at Sutherland Paper Co.

The Committee for Economic Development moved from the Department of Commerce Building, Washington, to 285 Madison Ave., N. Y. In announcing the move John Fennelly, executive director of the CED stated: "Wartime Washington is so crowded that every activity which can be moved to another city helps the war effort by making room for those activities which absolutely must be located next to government agencies."

Milprint, Inc., Milwaukee, has just published a booklet on metal replacement packaging. The booklet shows the various ways in which a cellophane pouch can be used to line either a cylindrical or rectangular carton.

Package designers with a nose for News...

Read how BEETLE* helped Vick
solve a merchandising problem
—and style the product, too!

One of the most attractive packages on drugstore shelves is this inhalant produced by the Waterbury Button Company for Vick Chemical. Molded of BEETLE Plastic, the Vick inhaler presents as trim a container as you are likely to find in merchandising today—or Tomorrow!

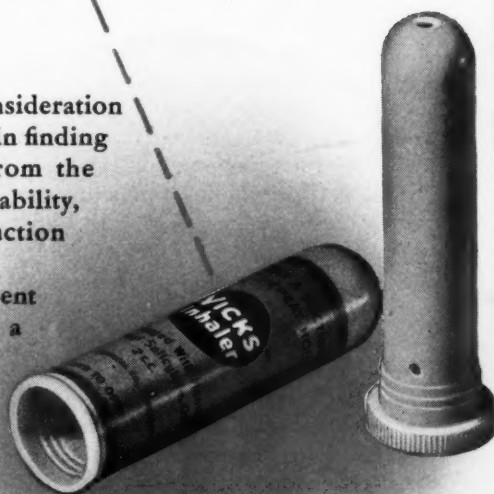
All these vital characteristics

Yet, surprisingly, *appearance* was a secondary consideration in the selection of BEETLE. The real problem was in finding a container material that would resist attack from the medication to be packaged. In BEETLE, with its durability, chemical inertness and adaptability to mass production needs, the package designer found the answer.

BEETLE also offers freedom from odor and taste to prevent product contamination, smart, pleasing appearance, and a ready adaptability to many types of design.

Planning the package for postwar

For the present, of course, BEETLE is restricted to essential packages and closures. But it is not too soon to be thinking of this colorful plastic for future packaging. Investigation now may solve Tomorrow's distribution problem... give you that all-important head-start—a more attractive and economical package—for postwar merchandising. In writing for more information, please use our Postal Zone Number—New York 20, N. Y.



CYANAMID PLASTICS
BEETLE • MELMAC • URAC
MELURAC • LAMINAC

AMERICAN CYANAMID COMPANY

PLASTICS DIVISION

34 ROCKEFELLER PLAZA • NEW YORK 20, N. Y.

*Reg. U. S. Pat. Off.



Saran film

(Continued from page 99) and tapes are cooled by a blast of cool air. Saran's low thermal conductivity allows the tapes to cool first and thus insures freedom from sticking to the tapes. Temperatures of the heated metal shoes must be controlled to a ± 4 deg. F., due to Saran's sharp melting point. Thus a very sensitive temperature controlling unit is required if satisfactory welds are to be made on this type of machine.

High-frequency welding has been performed successfully for some time on a laboratory scale. Saran, like most thermoplastic materials, readily lends itself to this type of joining. Although this type of sealing is still more or less in the experimental stage, it holds considerable promise as a method of sealing Saran film when machines of this type are commercially available.

Saran film in tubing form has been successfully closed by an ingenious method of sealing with soft lead rings. This method has been approved by military agencies for use in the Method II package. The ends of the tube to be closed are threaded through the lead ring, which is then clamped tightly onto the film by means of a clamping device or a large pair of pliers. This method of closure produces a moisture-vaporproof and watertight seal quickly and easily and without the use of heavy and cumbersome heat-sealing devices (see Fig. 13).

Attempts at sewing, stapling and binding Saran film are still in the experimental stage. Inasmuch as these types of joining do not produce moisture-vaporproof seals, it is doubtful if they will receive too much attention, at least, during wartime.

Typical of the present military uses for which Saran film is suited is the Method II package, used on the 50-calibre machine gun. This package was developed by the Frigidaire Division of General Motors Corp. (MODERN PACKAGING, July, 1943, page 72). The film has been approved for use in compliance with the following military specifications: ANC-67, AN-O-P-406 (Type 2), 100-14a (Type 2). Of the products approved by military specifications to be used as moistureproof barriers, Saran film is the only single-ply material. The other materials are dependent upon coatings or compounded by being laminated with other materials to obtain the properties required for this use. The film not only possesses these required properties but is transparent and package inspection can readily be made without opening the closure.

Difficulties sometimes encountered in moistureproof packaging with laminates are readily overcome by the use of Saran film. There is no dependence on the adhesive qualities of the laminating agent in a heat-sealed joint made with the film as it is homogeneous throughout its entire thickness. Another factor not to be overlooked is that all the required properties are obtained without the use of heavy, bulky, multi-ply materials. Saran film has an unusual flexible drape-like quality and can be folded and creased as is required in placing the packaged part in the outer container. This may be done without fear of cracking or fracturing along the fold after extended exposure to elevated or reduced temperatures for a considerable length of time according to results of tests made.

Saran film is subjected to certain wartime restrictions which confine its use to the packaging of metal parts and assemblies, as set forth in the Method II type military package. The base material—polyvinylidene chloride—is

subject to allocation in accordance with the Materials Conservation Order No. M-10.

The present Type M film was expressly designed as a packaging medium for metal parts and assemblies and has a taste and odor which are undesirable for general food use; however, developmental work is directed toward the elimination of this taste and odor. Other types of film for widespread applications in food packaging are the subject of further investigation.

The adaptation of the natural shrinkage of the film which is caused by exposure to elevated temperatures when the material is unrestrained to shrink packages has been under development for some time. Additional work of this nature is being carried on now in conjunction with casings for meats and poultry.

The immediate acceptance and the rapidly growing demand for the present type Saran film as a packaging material for war use and the experience gained from such use under wartime conditions assure its role as a major contender in post-war packaging.

Package versus bulk

(Continued from page 75) Since the report has not yet been released and because such a distribution cost analysis necessarily carries many important qualifying factors that could not be detailed in an article of this sort, no actual figures can be given here. However, the more important results of the study can be set forth in general terms. The explanation of the method of analysis that was set forth above points to the fact that although bulk handling does away with the cost of packaging, at the same time it incurs the costs of weighing and bagging the bulk rice in the store, which is not necessary for the packaged product. The put-up cost (cost of retail weighing and bagging) is an offsetting item that is overlooked by those who have been busy setting forth the reputed economies of bulk handling. More than this, however, our study shows, contrary to the belief of many in the grocery trade, that a few operations in addition to those of packaging and put-up (which are by far the most important in terms of the amount of the cost) show a sufficient cost difference between bulk and package handling to require inclusion in the calculation. One such case is bulk-packing at the mill, which may be avoided altogether if the rice is packaged at this point. Another is the cost of getting a package of rice from the shelf of the retail store for the consumer. This is by no means a negligible cost.

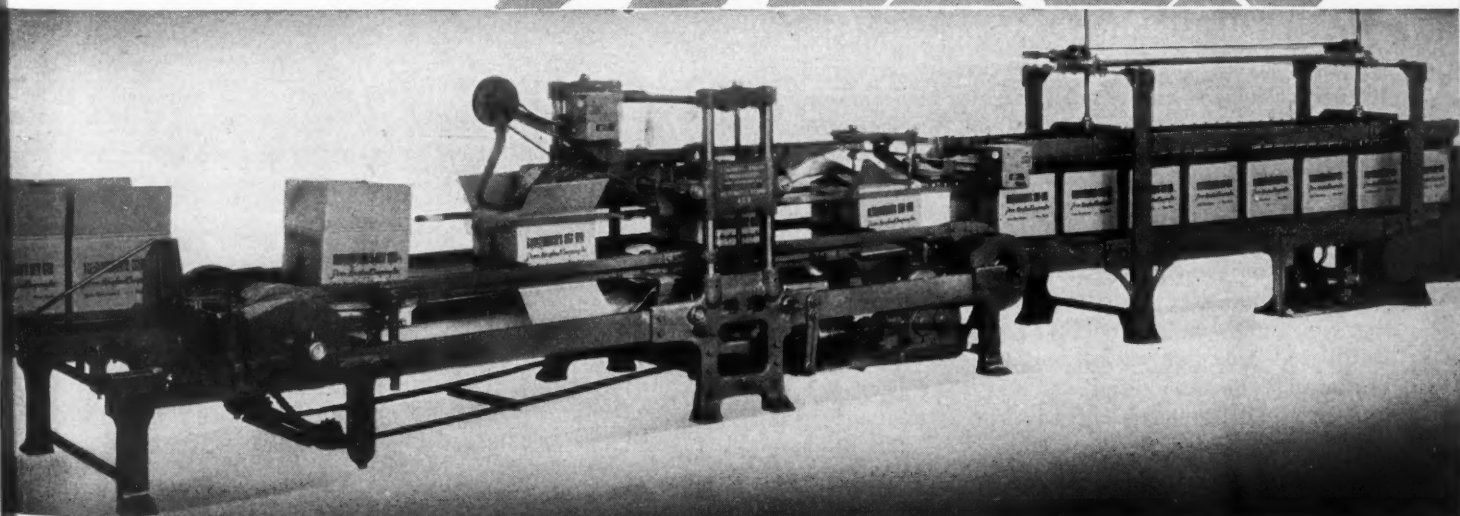
In determining the cost of packaging rice, which was necessary in order to compute cost differences, it was found that there was an amazing variation among the packaging operations at various local grocery warehouses. The highest-cost operation of the six that were covered was almost three times as costly as the lowest-cost operation and the remaining four had direct costs well scattered between these two extremes. Since these operations were representative of all local rice packaging, it is apparent that an average packaging cost figure, whether used for legislature or other purposes, is subject to very serious limitations for the particular market area to which the study was confined. It is also evident that there must be room for considerable improvement in the efficiency of some of the packaging operations at the various warehouses.

The direct cost of put-up of bulk rice in 11 retail stores

SOMETHING FOR OUR BOYS

Making bullets and packing them into machine-gun belts for our boys in khaki and blue is our business — or rather the business of our machines. We have developed this equipment specifically for war and they're not the sort of machines we would like to sell you.

Before the war our case-packers and case-sealers were found on the leading packaging lines in every industry: canned meats, cigarettes, household cleaners, etc. The 'know-how' that built this fine packaging machinery was able to handle the new problems of war — and will be available to all peacetime industries when the war ends.



STANDARD-KNAPP CORPORATION

MANUFACTURERS OF CASE SEALING, CASE PACKAGING, AND CAN LABELING MACHINES

FACTORY and GENERAL OFFICES—PORTLAND, CONNECTICUT

570 Lexington Ave.
NEW YORK, N. Y.

208 W. Washington Street
CHICAGO

702 Society for Sav. Bldg.
CLEVELAND

300 Seventh Street
SAN FRANCISCO

420 S. San Pedro Street
LOS ANGELES

3224 Western Avenue
SEATTLE

1208 S. W. Yamhill Street
PORTLAND, OREGON

Paul Brown Building
ST. LOUIS, MISSOURI

Windsor House, Victoria Street, LONDON, ENGLAND

located in the given market area showed even greater variation. The expense for the highest-cost store was about four times as great as that for the lowest-cost store. The put-up costs for the other nine stores were fairly widely scattered between these limits.

The figures for packaging and put-up costs do not include the cost of shrinkage, i.e., the loss of weight that occurs during each of these operations. This omission is due to the fact that reliable data on the amount of weight loss for the put-up operations could not be gotten. However, despite the fact that such loss could not be measured, observations and inquiry showed beyond a doubt that the cost of shrinkage, while it may vary greatly from one operation to another for both packaging and put-up, is by no means an insignificant item in the cost of both types of such distribution operations.

Finally, and most important, it was found that for 11 particular marketing channels each of which moved rice in both bulk and packaged form, package handling cost was less than bulk handling cost in five of the channels. The reverse was true in five of the other channels and for one channel there was no appreciable difference in the cost of handling the rice in bulk and in packages. However, the cost differences that favored package handling were much smaller than those that favored bulk handling. These cost differences had to be computed by using the direct costs of packaging and put-up because direct costs alone could be determined for all 11 channels. For eight of these channels total cost (excluding shrinkage expense) could be calculated for the put-up and packaging operations. Using these figures in computing the cost differences resulted in two channels showing package handling costs that were less than bulk handling and six contrariwise.

The packaged rice that moved through these 11 channels was all packaged at local grocery warehouses, which supply from one-third to one-half of the total packaged rice consumed in the market area to which the investigation was confined. For this sizable portion of the vast packaged rice volume of this metropolitan area our study creates a strong presumption that there are a very considerable number of cases in which it actually costs less to handle³ rice in packages than in bulk, although they are without doubt a minority.

The study also showed that the package was rendering the consumer distinct net additional services in the way of protection, cleanliness and convenience over those afforded by the paper bags used for putting up bulk rice for consumers. In the channels where package handling costs less than bulk these net additional services of the package to the consumer represent an additional advantage to the trade over and above the cost advantage, while the trade at the same time obtains the benefits of the selling work done by the advertising features of the package. In those channels where package handling costs exceed bulk handling costs, the difference in cost to the trade that runs against package handling must be set over against the net additional services of the package to the consumers and also the benefits to the trade of the advertising done by the package.

In conclusion, it may be said that the cost-difference pattern could be swung to a much more favorable position for package handling if improved, up-to-date machinery and operating methods were employed by more of the local rice packaging operations in the market area covered by the study.

³ According to the special use of this term explained previously.

Frozen victory gardens

(Continued from page 67) wrapper. No matter how protective the wrapping material itself may be, it is quite obvious that unless the wrapping is applied to prevent seepage of air or moisture through the folds, the wrapper cannot fully protect the meat in the way intended.

The method most generally used in locker plants today consists of placing the product to be wrapped on the sheet diagonally or on a bias, bringing one corner of the sheet up and over the cut of meat and then, in a rolling fashion, folding in the two opposite corners of sheet. The package is turned over and the remaining opposite diagonal corner of the sheet is folded over and the wrapper sealed in place by means of string or tape.

This is a simple and quick method of wrapping and its only weakness is that it does not provide for a positive closure as it is possible for air and moisture to seep through the folds of the wrapper.

Examination of cuts of meat wrapped in this fashion that had been frozen and stored in lockers for periods ranging from one month to a year or more, by carefully unfolding the wrapper from the frozen meat and observing closely the color of the meat, show signs of air or moisture seepage as evidenced by the presence of freezer burn—light grayish spots on the surface of the meat usually at points in the folds of the wrapper.

Increasing the size of the wrapper through tearing off more material than is actually needed to enclose the meat completely not only adds to the cost of packaging but fails many times to provide for a better sealed package. No matter how much wrapping material is used, whether it be cellophane or a good grade of locker paper or a combination wrap of cellophane and locker paper, it is still extremely important that the style of wrap be such as to provide for a good moisture-vaportight seal.

The other method of wrapping is not new or untried. It has been successfully used in other fields for years, particularly in the baking industry in providing a moisture-vaportight wrap for fresh cakes and other baked goods items wrapped in cellophane. It is working out successfully in a number of locker plants because of the saving in the amount of wrapping material used, as well as providing for a more positive moisture-vaportight seal.

The same principle applies in wrapping, whether it be your present locker plant paper, cellophane or a combination wrap of cellophane and locker paper and requires no more labor than a single-wrap as the wrapping is done all in one operation.

A combination wrap of cellophane and a sheet of locker paper has proved very successful in view of the added assurance against tearing which the cellophane receives by reason of the locker paper being on the outside. The paper also provides a surface for easy stamping or writing the name of item, date, locker number or other information required on each package.

Careful study and actual experience will solve the problems of proper packaging for frozen foods.

Credit: Containers shown in Figs. 1 and 2, Interstate Folding Box Co., Middletown, O. Bag-in-box in Fig. 4, Sutherland Paper Co., Kalamazoo, Mich. Carton in Fig. 5, Container Corp. of America, Chicago, Ill. Bag in carton in Fig. 6 by Bloomer Bros., Newark, N.J. Bag in Fig. 7, Thomas M. Royal & Co., Philadelphia, Pa.



MASTER CRAFTSMEN

BALTIMORE, MD.
Maryland Paper Box Co.

BOSTON, MASS.
Bicknell & Fuller Paper Box Co.

BROOKLYN, N. Y.
Specialty Paper Box Co.
E. J. Trum Co., Inc.

BUFFALO, N. Y.
Thoma Paper Box Co.

CHARLOTTE, N. C.
Old Dominion Box Co.

CHATTANOOGA, TENN.
Atlas Paper Box Co.

CHICAGO, ILL.
Kroek Paper Box Co.

COLUMBUS, OHIO
Columbus Paper Box Co.

DANVERS, MASS.
Friend Paper Box Co.

DETROIT, MICH.
Stecker Paper Box Co.

HOBOKEN, N. J.
Shoup-Owens, Inc.

KANSAS CITY, MO.
Crook Paper Box Co.

LOUISVILLE, KY.
Finger Paper Box Co.
Kentucky Paper Box Co.

MERIDEN, CONN.
Shaw Paper Box Co.

NASHVILLE, TENN.
American Tri-State Paper Box Co.

NEWARK, N. J.
Mooney & Mooney
Newark Paper Box Co.

NEW YORK, N. Y.
A. Dorfman Co.

PAWTUCKET, R. I.
Shaw Paper Box Co.

PHILADELPHIA, PA.
Datz Mfg. Co.
Walter P. Miller Co., Inc.
Edwin J. Schoettle Co.
Geo. H. Snyder, Inc.
Sprowles & Allen, Inc.

PITTSBURGH, PA.
Keystone Box Co.

PORTLAND, ME.
Casco Paper Box Co.

PROVIDENCE, R. I.
Hope Paper Box Co.
Taylor Paper Box Co.

SEATTLE, WASH.
Union Paper Box Mfg. Co.

SOMERVILLE, MASS.
Consolidated Paper Box Co.

ST. JOSEPH, MICH.
Williams Bros.

ST. LOUIS, MO.
Great Western Paper Box Co.
Moser Paper Box Co.
F. J. Schleicher Paper Box Co.
Service Paper Box Co.

UTICA, NEW YORK
Utica Box Co., Inc.

WILMINGTON, DEL.
Wilmington Paper Box Co.

TORONTO, CANADA
The Flieder Paper Box Co., Ltd.

UNTIL VICTORY IS WON—BUY BONDS

TODAY, war production comes first. But to create post-war jobs, numerous manufacturers have already completed plans for products they will turn out in peacetime. And many of these products will be packaged for added sales appeal in set-up paper boxes. The custom-built set-up paper box is the most versatile of packages; and none is more beautiful. Its attractive covering papers enhance its appeal.

If you are an executive interested in post-war plans, why not talk to a Master Craftsman in the field of packaging. Like yourself, these men are creative, welcome a problem, and know how to produce economically.

Master Craftsman
OF THE SET-UP PAPER BOX INDUSTRY

Cooperating Suppliers: Appleton Coated Paper Company; Blackstone Glazed Paper Company; Bradner Smith & Co.; Louis Dejonge & Co.; Globe Mfg. Co.; Hampden Glazed Paper & Card Co.; Hartford City Paper Co.; Hazen Paper Company; Holyoke

Card & Paper Co.; Hughes & Hoffman Co.; Lachman-Novasol Paper Co.; Marvellum Company; Matthias Paper Corp.; Nashua Gummed & Coated Paper Co.; Pelepscot Paper Co.; Plastic Coating Corp.; Racquette River Paper Co.; Stokes & Smith Co.

Must labels be blacked out?

(Continued from page 85) the Army's requirements can be met while at the same time preserving merchandising advantages for American canners.

That Washington is not unaware of the selling job that labels do is indicated by OWI's current activity in developing a national insignia for all lend-lease shipments. Examples of these latest approved insignias, in many languages—which are intended in the future to go on food can labels also—are shown in Fig. 3.

So far, Uncle Sam has done a poor job of label propagandizing. In North Africa and in the South Seas, invading American troops have found American labels outshown by those of Allies and even by those of the enemies. A collection made by a member of the armed forces in North Africa from stores supplying the civilian population shows that German, Italian, British and Australian brands generally bear beautiful, full-color labels; the one American label is a drab, black-and-white affair.

Similarly, Fig. 4 shows samples of labels taken from the commissaries and stores in Borneo. Australian brands show to good advantage, but the few American labels are among the poorer specimens, as regards both attractiveness and durability.

Looking ahead into the postwar period, the new water-resistant labeling technique would appear to have distinct possibilities. It might permit breweries to apply paper labels to beer cans, capable of withstanding immersion in ice-water coolers. It might permit packers of citrus fruits, apple, tomato and other juices to merchandise their products in this manner, like soft drinks. Moreover, the same labels and adhesives are said to be suitable for use on cylindrical glass and waterproof fibre containers.

Credit: Water-resistant labels by Stecher-Traung Lithograph Corp., Rochester, N. Y. Water-resistant adhesives by National Adhesives Division of National Starch Products, Inc., New York.

Navy standards—

(Continued from page 70) to see that there was much work behind the system developed by the Naval Clothing Depot. The choice of the particular types of cartons now in use was not based upon guesswork, but upon experimentation and study. The type of container to be used for each of the hundreds of items handled and how these items were to be arranged and folded was undoubtedly also a major point for consideration. In getting the approval of the proper authorities in Washington for the system, the depot used photographs and charts to show the various sizes of containers most suitable for standardization and how these could be palletized. Once the system has been approved, the next step was to get it into effect.

To enable contractors and suppliers to send the articles they furnish the depot in conformance with the system, a "Navy Handbook for Packaging, Packing and Marking of Clothing, Small Stores and Textiles," was prepared for their use. It contains detailed instructions for style of carton, dimensions, size and weight of material to be used, how to mark, including size of print, how to center, spacing of letters. It also tells how the contents of the packages are to be arranged,

and applies to items which the Navy uses as diverse as whisk brooms and mattresses.

The handbook is useful in several respects. Formerly, specifications, contract requirements and purchase orders contained as many as two or three pages of instructions on how to package and how to arrange contents in the packages. Now there is merely a line referring to the handbook. Since the handbook is being put into the hands of all boxmakers, the relaying of the detailed instructions all along the line will no longer be necessary. Another advantage is that the instructions in the handbook were compiled by specialists in packaging and they are couched in the language of the industry. This was not always true in the past and it makes for better understanding.

The willingness of the Navy—and of Captain Kirk and his depot in particular—to draw upon the knowledge and experience in industry, and to adapt those resources to its own uses, is commendable. Industry, in turn, can learn from the Naval Clothing Depot's project, since many of its features are applicable in specific packaging fields.

An engineer speaks—

(Continued from page 91) giving as much thought as is possible to these matters in view of their wartime problems. They may have many answers to these suggestions already on the drawing boards. But the feeling among users is that the pressure of the necessity of these suggestions would be felt much more, if designers could see more at first hand how their designs are working out. Most users would welcome further collaboration of this sort. If the designers could live a little more with the troubles, as users do every day, their horizon would be broadened along the lines which need their attention.

It may be that only new entrants to this field, those who must look to converting from war goods to peace goods, can "see the forest for the trees." It may be that users must design and build their own equipment. But thoughtful users are confident that somewhere, somehow, strides will be made toward better equipment for after the war and these strides will be made toward safer and faster production.

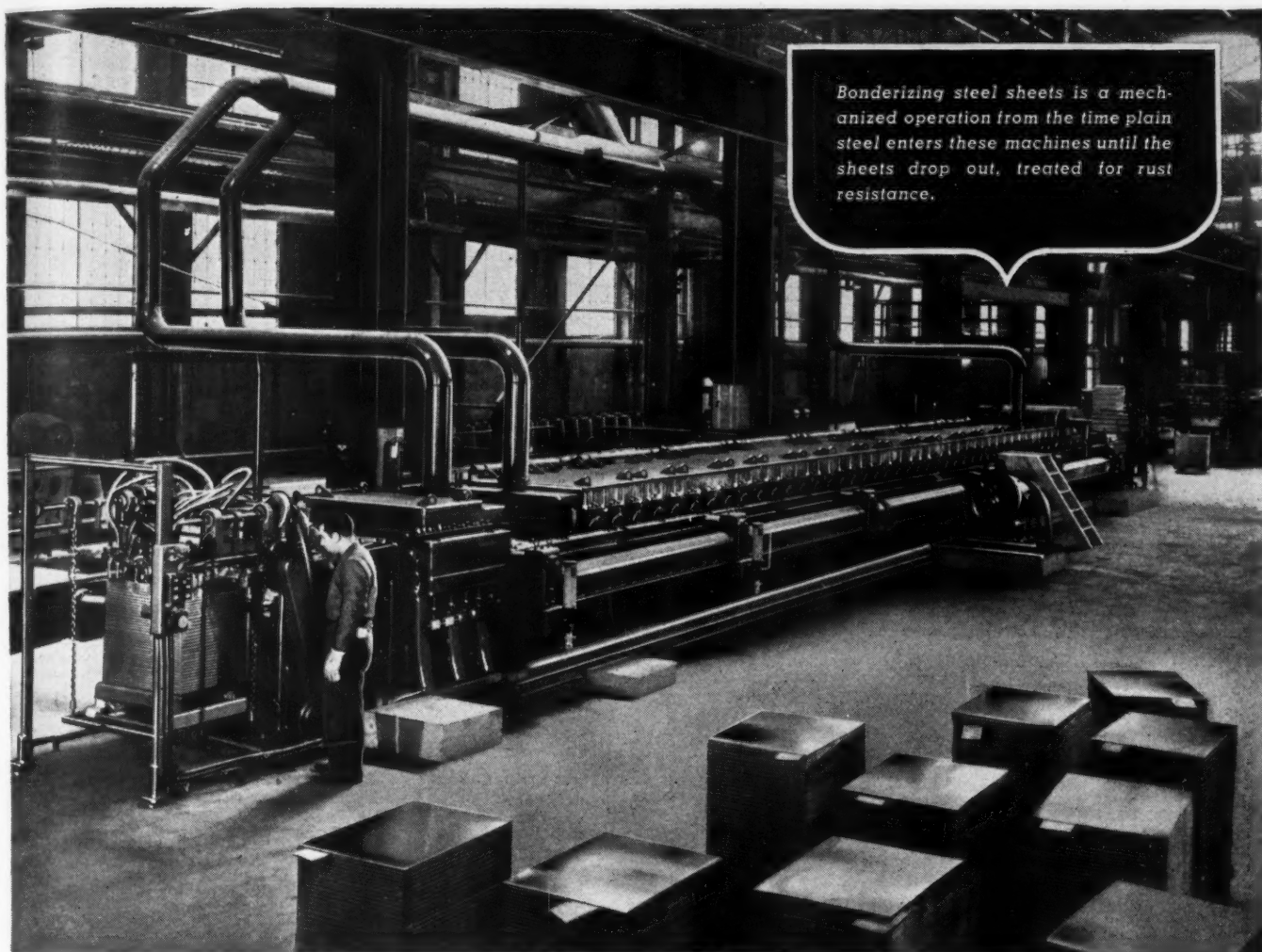
What makes cans corrode?

(Continued from page 104) normal manner. This complete closure did not cause condensate to form in any of the boxes.

7. The coating of the inside surface of the Code C with Du Pont weatherproof No. 77, prior to kiln treatment seems to indicate that the polyvinyl alcohol base adhesive does not in itself promote corrosion of the cans.

8. The cans from the American Can Co. and those from the Continental Can Co. were equally corroded throughout the course of the investigation.

9. The individual cans which were placed in the kiln unboxed and which were only slightly corroded would seem to indicate that major source of corrosion is in the container itself, perhaps due to a chemical constituent of the pulp furnish, e.g., alum, sulphur or iron.



Bonderizing steel sheets is a mechanized operation from the time plain steel enters these machines until the sheets drop out, treated for rust resistance.

Chemistry Created Bonderized Steel Sheets to take a vital part in winning the war

Canned food is of vital importance in both military and civilian life, and the economical packaging of our critical food supply is one of our pressing problems. An important contribution toward its solution was the creation of the Bonderized steel sheet—a new material for the production of cans, containers and closures. While this material had its inception in the Parker research laboratories, it took the close cooperation of the technical staffs of the leading can manufacturers and steel mills to quickly make it a practical commercial product. Countless detailed problems had to be faced and licked by this team.

For months now American steel mills have been turning out tons of Bonderized steel sheets for the can and container industry. This is a new, useful manufacturing material. It has the strength of steel, rust resistance, excellent enamel adhesion, and the forming and other manufacturing qualities necessary to its practical commercial use.

War stimulated the development and application of Bonderized sheet steel—but it will remain long after the war as a useful packaging and closure material, because of proven valuable characteristics.

PARKER RUST PROOF COMPANY

2187 E. MILWAUKEE AVE., DETROIT 11, MICHIGAN

PARCO LUBRIZING

Parco Lubrizing is a chemical treatment for iron or steel friction surfaces, in mechanical assemblies, that improves bearing properties, and retards wear.

BONDERIZING

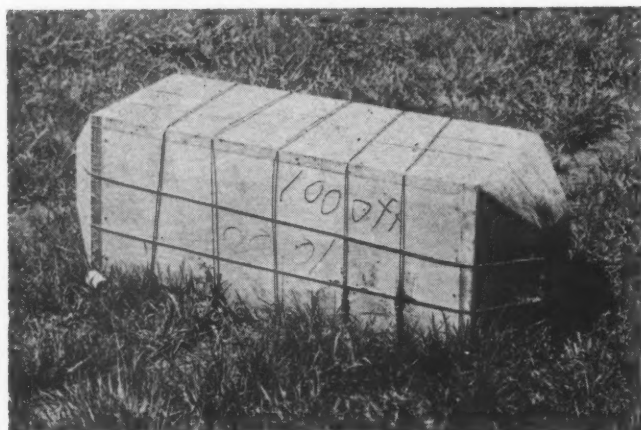
Bonderizing is a chemical treatment for iron, steel, or zinc that insures cohesion of applied coatings of paint, enamel or lacquer, resulting in longer-lived, rust-resistant finish.

PARKERIZING

Parkerizing is a chemical treatment for iron or steel, resulting in a surface that can be stained, oiled, waxed or painted and is substantially resistant to rust.

PARKER PRODUCTS CONQUER RUST

Pug-nose box withstands 1,000 foot drop from plane



Above, close up of the wire-strapped aerial unit. Below, medical supplies unpacked from these new cases after test drop with all bottles and other equipment intact.



THE Army's answer to keeping ground troops supplied from the air may be found in this new pug-nose wooden container which can be dropped without parachute.

The new box is a development of Army Air Corps officers from Wright Field, Dayton, Ohio, and a Chicago maker of steel strapping. Cargo planes have dropped test consignments of food, ammunition, gasoline and medical supplies placed in these boxes from heights of a 1,000 feet without parachutes and with almost 100 per cent recovery.

Other consignments, packed deep in excelsior and weighing from 100 to 200 lbs.—even including delicate instruments—were said to have been dumped out at 200 m.p.h. from 2,000 feet with breakage averaging only 0.5 per cent.

The boxes are made of three-quarter-inch lumber and have pug noses to prevent rolling. The top is left slightly open and the box is wrapped with strands of wire by a machine which tightens, ties and cuts the wire. The strands have a tensile strength of 14,000 lbs. per square inch, it is claimed. When the package lands the wire and the open top permit the box to stretch freely, but prevent breakage.

Military spokesmen say this shockproof unit has advantages over the use of cargo parachutes, because it allows greater accuracy in placing deliveries and lower flight altitudes that reduce chances of the action being spotted by the enemy.

The boxes cost an average of \$2.75 apiece, in comparison with an average cost of \$25 for a parachute. Probable post-war uses include speedier delivery of air express and mail at intermediate points, it is said.

Credit: Collaborating designers of box and strapping, The Gerrard Co., Chicago.

New technique—drugs

(Continued from page 87) to the United States and marketed it as Massol in 1910. This was a forerunner of Acidophilus which came out in 1921.

In 1910, Dr. Lederle needed more room for research and manufacturing and moved his plant to Pearl River, N. Y., where it continued to expand and Lederle's smallpox vaccines and tetanus antitoxins soon became famous the world over.

During World War I, Lederle Laboratories was the only American source of gas gangrene antitoxin. The company was purchased by American Cyanamid Co., Inc., in 1930.

Since then the research and manufacturing facilities have increased and the business expanded to include pharmaceutical specialties and standard products. Today, although the biological sales have continued to increase, they are but a small part of the total business. Among other projects Lederle has been a leader in the development of sulfa drugs and vitamin products, and is at present building one of the largest plants in the country for the production of the new life-saving drug penicillin.

Credit: Package designs, Arthur S. Allen, New York.

Questions and answers

(Continued from page 106) carton stocks printed with dark-colored inks, it may be necessary to open a few sample packages and observe the staining on the inside since the dark-colored areas will not show grease staining on the outside. Different package materials and different methods of making the closure will probably give a wide difference under this test and it should give a reliable index of the ability of the package to hold this fat. Test can be supplemented with taste and flavor examination after various periods in the oven compared with samples retained and held in cool storage. The later examination will provide you with information about the stability of the fat and whether or not any of the elements of the package are causing contamination of the product. As a control test for your materials, I suggest that you follow Technical Assn. of the Pulp and Paper Industry Specification No. T454M-42 for grease resistance of paper except that you use as a testing liquid the fat which is contained in the product colored red as indicated. It might be advisable to make this test on flat as well as on creased samples.



DON'T SABOTAGE OVERSEAS SHIPMENTS

The safe arrival of overseas shipments is vital to ultimate victory for the United States and our allies. These must be packaged for delivery to any point in the world. Such packages cannot be designed for specific climatic conditions due to rerouting of most materials to meet the varying needs from the many air fronts. GLU-WELD adhesives used to seal waterproof paper liners and "Victory Board" containers assure the packager of perfect closures whether the shipment ultimately arrives at the freezing ports of Russia or the tropical climate of the South Pacific.

Write today for our booklet "GW-1", which will tell you the full story on GLU-WELD.

Or better yet, send us a small sample of your board. We will, in turn, forward a sample of the proper GLU-WELD formulation.

IN THE EAST

Union Paste Company

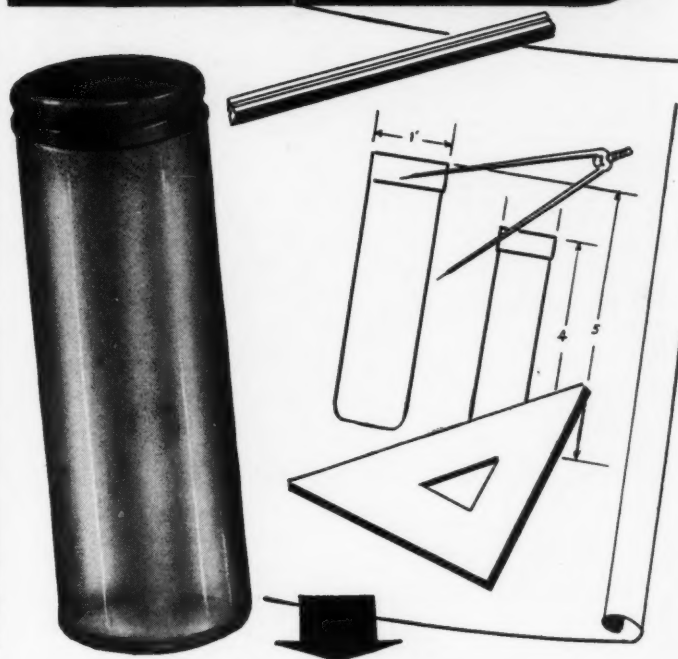
1605 Hyde Park Ave., Hyde Park 36, Mass.

IN THE MID-WEST

The F. G. Findley Co.

1230 No. 10th St., Milwaukee 5, Wis.

THE SHAPE OF THINGS TO COME



Post-War Products will be MERCHANDISED in LUSTEROID Vials and Tubes

With an eye to post-war merchandising, more and more manufacturers are shaping their plans around LUSTEROID. They know it will pay them to dress their products in containers that display as well as protect.

By every standard, LUSTEROID meets the most exacting requirements of modern display-merchandising. Amazingly light in weight. Strong, rigid and unbreakable. Transparent for product visibility. Colorful for eye appeal. Economical, too. No protective partitioning or special packing needed. No labels to affix because the sales message can be reproduced as an integral part of the container. They save work, time and money.

All colors . . . clear or opaque . . . with cork, slip-on or screw-cap closures. Diameters from $\frac{1}{4}$ " to $1\frac{1}{4}$ " and lengths up to 6".

Write for complete details

LUSTEROID CONTAINER CO., Inc.

FORMERLY LUSTEROID DIVISION
OF SILLCOCKS-MILLER COMPANY

OFFICE AND FACTORY

10 PARKER AVENUE W. MAPLEWOOD, N. J.
MAILING ADDRESS SOUTH ORANGE, N. J.

Saved... **THE LABOR OF 2 PERSONS**

"We saved the labor of two persons and made a very satisfying saving by the use of Silverstitcher."

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Chicago Mfr.

Replace Labor Shortage With **ACME Silverstitchers**



...AND YOU CAN SAVE MONEY TOO. This improved stitching equipment assures faster, easier box stapling. In some plants, output has been doubled, costs cut and complete satisfaction is the rule where Silverstitcher is in use.

FOR BEST RESULTS, USE ACME SILVER-STITCH STAPLING WIRE. This silvery wire is made in six standard sizes...true to size and temper, provides stitches which clinch tightly and stay that way. Try it on your present equipment.



A SILVERSTITCHER TO SUIT YOUR USE. Sturdily built Silverstitchers are made in various sizes and types to meet your requirements. Many exclusive features mean quiet, trouble-free, speedy operation. Sold under guarantee.

YOU'LL NEED A PRIORITY

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send coupon below for FREE Booklet giving complete details about Acme Silverstitchers.

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Branches and Sales Offices in Principal Cities

ACME STEEL COMPANY,
2843 Archer Avenue, Chicago, Illinois
I'm interested in faster, easier, box stitching at lower cost. Send me FREE Folder with all the facts.

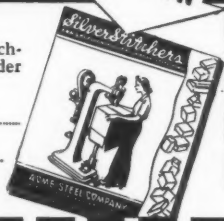
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MICRO-CRYSTALLINE PETROLEUM WAX

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In RED STREAK tapes you find a combination of good papers, good glue and plenty of it, that gives you the best sealing job possible.

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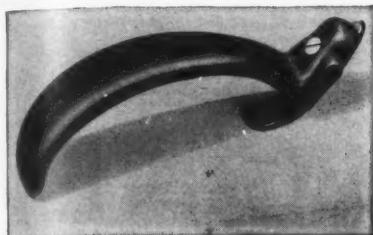


**"Red
SEALING**

**Streak"
TAPES**

BROWN-BRIDGE MILLS, Inc., Troy, Ohio.

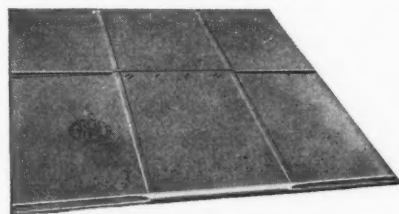
To Conserve Shipping Containers



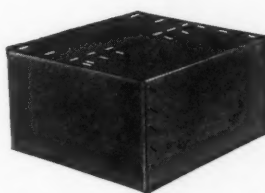
WIRE STITCH REMOVER

Price \$1.60 Postpaid

materially reduce the time and cost of preparing wire stitched containers for their return trip for re-use. Send orders to New York Office.



Box with Stitches Removed and
Flattened for Return Trip



Box Stitched
Top and Bottom

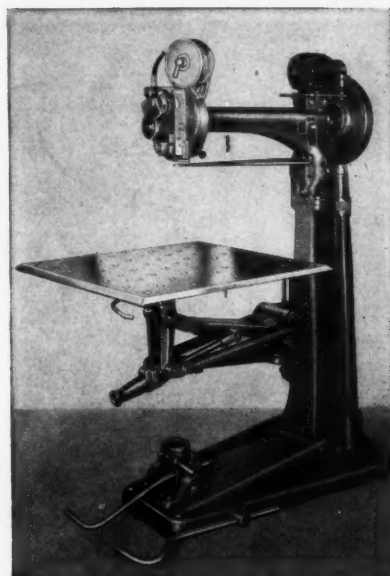
DEXTER FOLDER COMPANY

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CHICAGO, ILL.

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BLISS TOP and BOTTOM STITCHER

For assembling cases, the blade anvil is lowered, table is swung to one side, and post placed in position for bottom stitching. For top stitching, the post is removed and blade anvil and table swung into position. Change is made in less than one minute.



After sixty years of close contact with paper converters throughout the world, we now find ourselves engaged in an all-out production of essential equipment for the war program.

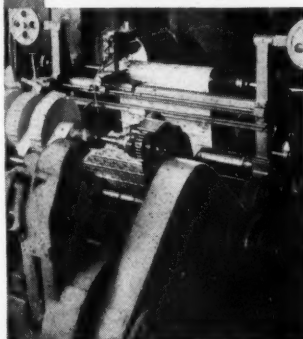
The army and the navy now have first call on our men and machines and we are unable to accept orders for machines, or parts used in our machines now operating unless the War Production Board deems the same necessary for promoting the war effort.

We want to keep in touch with all of you. We want to help you keep up the flow of essentials from mills and converting plants. If we can advise you, do not hesitate to call on us. If you need machines or parts which the War Board will pass favorably upon, we will try to serve you. We wish, however, to advise that army and navy requirements will come first until no longer needed.

HUDSON-SHARP
MACHINE CO • GREEN BAY • WIS

**We are wondering how we
ever got by without it —**

So writes E. A. Bradshaw, of Bradshaw's Limited, Toronto, about a Camachine Electric Eye Side Guide Control which incorporates also a Camachine Constant Web Tension Control. "Our enthusiasm for the work it is doing increases every day," says Mr. Bradshaw, and that is understandable, for his plant is slitting small wraps which require a very close sidewise register.



For precision register, side-wise and lengthwise, on web printing presses—and for accurate, uniformly rewound rolls on slitting and rewinding equipment—the Electric Eye Side Guide Control with Constant Web Tension Control is a money-earner. Write for descriptive literature.

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CAMACHINE

Save Paper!

Every Armful Counts



Your supply of paperboard depends on the ability of the paperboard mills to obtain waste paper.

Urge your employees, neighbors and friends to save waste paper.

Remember, every armful does count.



OTSEGO, MICHIGAN PHONE KALAMAZOO 5500
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THIS ONE

and a MILLION MORE WRAPPED
on a HAYSSEN Automatic

The high-speed HAYSSEN automatic wrapping machine does such a perfect job that you can't tell the first package from the millionth in the same run.

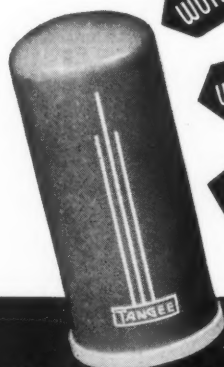
Perfect registration is achieved through the photo-electric cell. Capital investment is low, so is upkeep. Handles both Cellophane and waxed paper. Design is simple and parts are interchangeable. Speed is rapid and may be adjusted to any production, within range. Every package wrapped on the HAYSSEN is a perfect job.

Send for further data, quotations.

HAYSSEN MFG. CO. SHEBOYGAN WISCONSIN
Builders of Wrapping Machines for more than 30 years

Finally!

A DURABLE
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THE PAPER TUBE HAS COME OF AGE. WAR-TIME NECESSITY WAS THE SPRING-BOARD TO PUBLIC ACCEPTANCE. IT IS ON THE FIGHTING FRONT WITH MEDICINE, RADIO AND OTHER COMMUNICATIONS. IT IS ON THE HOME FRONT IN MANY UNIQUE PACKAGING FORMS, SUBSTITUTE CANS, COSMETIC CONTAINERS AND — OUR OWN UNIQUE ALL PAPER SWIVEL LIP-STICK CONTAINER. THE POST-WAR PERIOD WILL LIFT THE HORIZONS OF THE PAPER TUBE CONTAINER STILL FURTHER — WILL PLANT IT EVEN MORE FIRMLY IN THE PACKAGING FIELD AND IN THE FIELD OF ELECTRONICS.

OUR ORGANIZATION IS NOW WORKING TOWARD THESE GOALS. LET US HELP YOU PLAN YOUR POST-WAR PACKAGES.

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MANUFACTURERS OF PRECISION PAPER TUBE PRODUCTS



SEALED SAFELY WITH

JOHNSON'S

Waterproofing Waxes for Cartons and Packages

"Get 'em ashore fast!" That's the order . . . even though it means a dip in the sea for many cartons and packages.

Overseas shipments can't have too much protection against moisture. That's why many manufacturers are giving their packages "extra" protection afforded by Johnson's Waterproofing Waxes.

Perhaps you're packaging vital war materials in cartons and paper, materials that *must* have moisture protection. We suggest you get all the facts about Johnson's Waterproofing Waxes for Cartons and Packages. Write us today for full particulars.

Made by the makers of JOHNSON'S WAX

S. C. JOHNSON & SON, INC.

Industrial Wax Division • Dept. MP 103 • Racine, Wis.

★ BUY UNITED STATES WAR BONDS AND STAMPS ★

Memo:

*Ship Allied Headquarters
Algiers Extra Supply
Memo Pads 12-1-43*



Miller Model MP Wrapping Machine and Corley-Miller Speed-Wrap wrapping paper pads at Rockwell-Barnes Company, Chicago

PAPER, indispensable carrier of the written message, must proceed in uninterrupted flow to our army and navy. Rockwell-Barnes Company, Chicago, insures steady output and high-speed production on government contracts by wrapping their packages with the Miller Model MP Wrapping Machine and Corley-Miller Speed-Wrap Combination. 3×5 ", 6×9 ", and $8 \times 10\frac{1}{2}$ " pads, also $8\frac{1}{2} \times 11$ " reams, are all wrapped on these machines. The packages are sealed with cold glue, no gummed tape required. One operator is used to feed the reams or pads into the machine. All packages are end sealed, and can therefore be wrapped with a minimum amount of paper. The wrapping paper is fed from a roll.

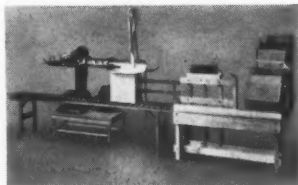
If you have a problem involving wrapping, bag making, filling, or sealing, consult Miller. Write for information.

MACHINES FOR: WRAPPING, BAG MAKING, BAG AND CARTON FILLING, BAG CRIMPING OR CLOSING, GLUING AND SHEETING



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Chicago 16, Illinois

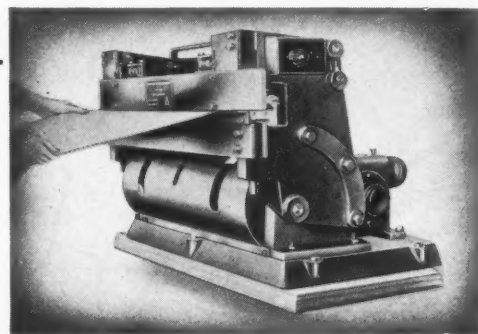


Amsco Model CL-2 Rotary Bag Sealing Machine

Shipping War Materiel in Bags?

Amsco Rotary Bag Sealing Machines provide moisture-vapor proof sealing plus high speed production. Amsco Rotaries have gained wide popularity for sealing bags containing rations, dehydrated foods, drugs, bandages, ordnance materials, and other begged products. Companion equipment including bag openers and loaders, air extractors, and conveyors is also offered.

JAW-TYPE HEAT SEALER FOR Versatile PRODUCTION



● The jaw-type heat-sealing machine manufactured by Automatic Scale is a machine of wide versatility. It can be used for hand-sealing of lightweight packages, and for bag making. The same machine can be tipped to handle heavier packages. Automatic heat-sealers are widely used for wrapping packages and making bags for export shipping. The heat seal is as strong and water-tight as the material itself. These machines handle bags up to 30" wide in all heat-sealing materials. Temperatures from 70° to 500°F.



AUTOMATIC SCALE COMPANY

INCORPORATED

591 HUDSON STREET
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THE Unknown Package

Victim of a faulty adhesive, the package that loses its label loses not only its personality but its identity as well. All the trouble of making its contents the best in the field—all the effort of creating a sound container and sending it through modern automatic production—all are lost when the glue fails.

Bingham glues stick on all types of packages under all sorts of circumstances and climates. Let our technicians recommend one of our adhesives for your purpose.

"Make Your Identity Stick"

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Every Kind of Roller and Adhesive



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HI-SPEED ROTARY HEAT-SEALER

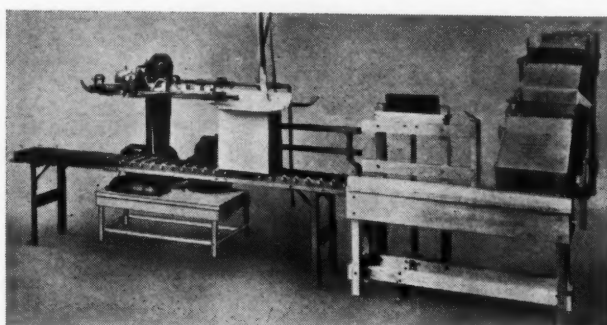
Eliminates Bottlenecks in War Plants

Whether packaging rivets, or large and small parts for aircraft, the AMSCO rotary sealer will give the speediest operation, and the most efficient in terms of quantity, space-saving and labor cost.

An unique packaging principle gives the AMSCO Hi-Speed Rotary Heat-Sealer extra speed, turning former bottlenecks into the smoothest function of many production lines.

450 linear inches of perfectly moistureproof heat-sealing per minute—a speed that is faster than most lines require. Ease of operation reduces operator fatigue and expediting output. Air extraction from packages before sealing eliminates oxidation danger. Maximum production in a minimum of space and low labor cost.

Many war industries have eliminated packaging bottlenecks with AMSCO equipment. An AMSCO engineer will be glad to describe and demonstrate their possibilities to you.



AMSCO Equipment Packages

explosives	dehydrated soup
sulfa drugs	batteries
plaster bandages	teletype ribbons
first-aid kits	tobacco
emergency field	blood plasma
rations, C, J,	photographic
D, K	film and sup-
fruit bars	plies
lemon extract	rifle and machine
bouillon	gun parts
cocoa	rivets and small
salt and sugar	assemblies
life boat rations	large assemblies
tank and truck	and subassem-
parts	blies
	dehydrated foods

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Striping . . . Cornering . . . FLOQUIL — new speedy, approved method for marking overseas shipments for Armed Services. Applies APPROVED SERVICE COLORS by roller. We supply rollers, colors, tanks. Also: FLOQUIL Salvage Kraft color for salvaging and re-using packing cases. FLOQUIL METHOD IS LOW-COST, FAST-DRY, CLEAN. Send for literature, color cards.

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*Expert Assistance
in the Development of*

WAR TIME PACKAGES

For WAR MATERIALS

For CONSUMER ITEMS

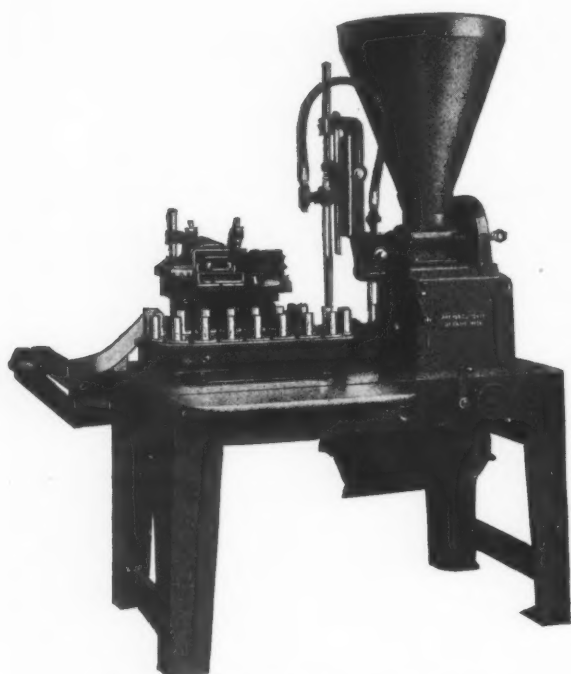
affected by Government orders
covering packaging materials

Ritchie
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No. 17-A. Improved Automatic Tube Filling, Closing and Crimping Machine

YOUR IMMEDIATE ATTENTION IS CALLED TO THIS **NEW NO. 17 IMPROVED AUTOMATIC TUBE FILLING, CLOSING AND CRIMPING MACHINE** for SEALING COLLAPSIBLE TUBES. TYPE "A" for PASTE. "B" for POWDERS. "C" for LIQUIDS.

The famous COLTON CLOSURE machine has been greatly improved and simplified. It now offers you these new advantages:

1. Motor is underneath, out of the way.
2. Equipped with REEVES drive for speed control.
3. New design filling head gives a positive free smooth action of nozzle.
4. Start and stop push button switch.
5. Two hand levers. One for starting the machine proper. One for stopping and starting filling mechanism.

All of these improvements—yet no increase in price. Write today for a sample tube and full information on this machine.

ARTHUR COLTON CO.

2602 JEFFERSON AVE., EAST
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CHARTS reprinted from 1943 PACKAGING CATALOG

Chart of Functional Packaging Materials

Tabulates physical, chemical and mechanical properties of all flexible commercial packaging materials—the first over-all standardized compilation.
each . . . 75¢

Packaging Materials Under Government Control

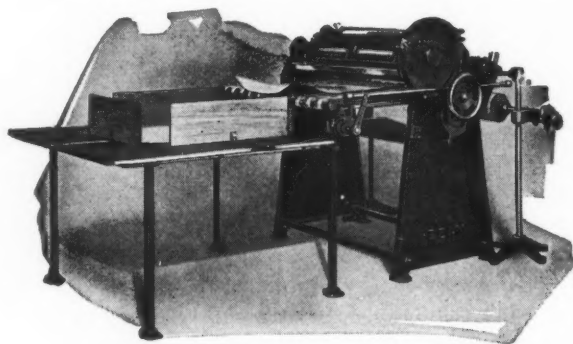
Lists all materials affected by Government order, from Acetone to Zinc, and gives reference to proper order by number.
each . . . 50¢

THE TWO CHARTS \$1

Please send remittance with order to
Industrial Magazine Service, Inc.

122 East 42nd Street
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*Many Great Nations Are Already
Planning Post War Programs*
as are also many business men—**ARE YOU?**



THE BECK SHEETER

After "Unconditional Surrender" is a fact of history, you will want the highest productive Sheeting equipment obtainable, to meet competition. Your choice may be from the hi-speed Electric Eye machines for "spot sheeting" down to the more simple standard machines for plain work.

Write us to-day for to-morrow.

CHARLES BECK MACHINE CO.

13th & Callowhill Streets

Philadelphia, Pa.



"Electric fingers"

... to do your packaging

It's pretty hard to find human fingers to do the work today, but Triangle Elec-Tri-Pak Vibratory Feed Weighers are ready to package all kinds of candies, marshmallows, etc., in cans, cartons, bags or bottles. The electric fingers of the Elec-Tri-Pak handle your product gently, weigh it carefully to fraction-of-an-ounce accuracy and save you time, money and headaches. Users report labor savings as high as 60%; space saving of 1/3 and more, and many other benefits.

A complete range of models is available to meet any requirements. For high speed and continuous production, completely automatic Elec-Tri-Line Systems are available.

For full details, write explaining your needs.



Illustration above shows Elec-Tri-Pak at Jewel Tea Co. packaging candies.
WRITE FOR BULLETIN

TRIANGLE PACKAGE MACHINERY CO.

907 NO. SPAULDING AVENUE, CHICAGO

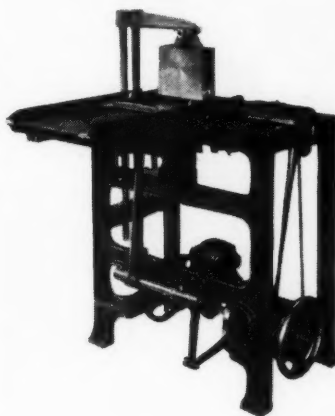
Offices in Principal Cities, United States and Canada

WEIGHERS — FILLERS — CARTON SEALERS

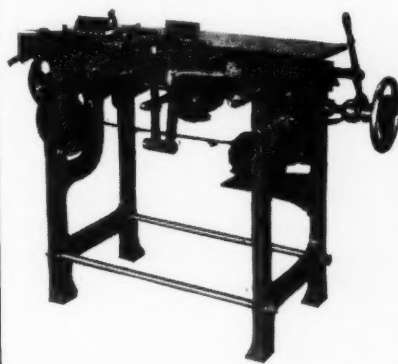
IT'S SMART TO MAKE YOUR POST-WAR PLANS NOW

Many changes in production requirements have taken place since the war began. Where formerly it was possible to get along with slow packaging methods, it has now become almost out of reason to endeavor to continue in this vein. Greater production is the key to winning the war as soon as possible and greater production will be the key to efficient and profitable operation when peace is again restored.

If you are unable to obtain a high priority now, investigate these machines for installation as soon as possible after the war. Send us a sample of each size carton you desire to handle and we will recommend machines to meet your specific requirements.



This PETERS JUNIOR CARTON FORMING AND LINING MACHINE sets up 30-40 cartons per minute, requiring one operator. After the cartons are set up, they drop onto the conveyor belt where they are carried to be filled. Can be made adjustable to handle several carton sizes.



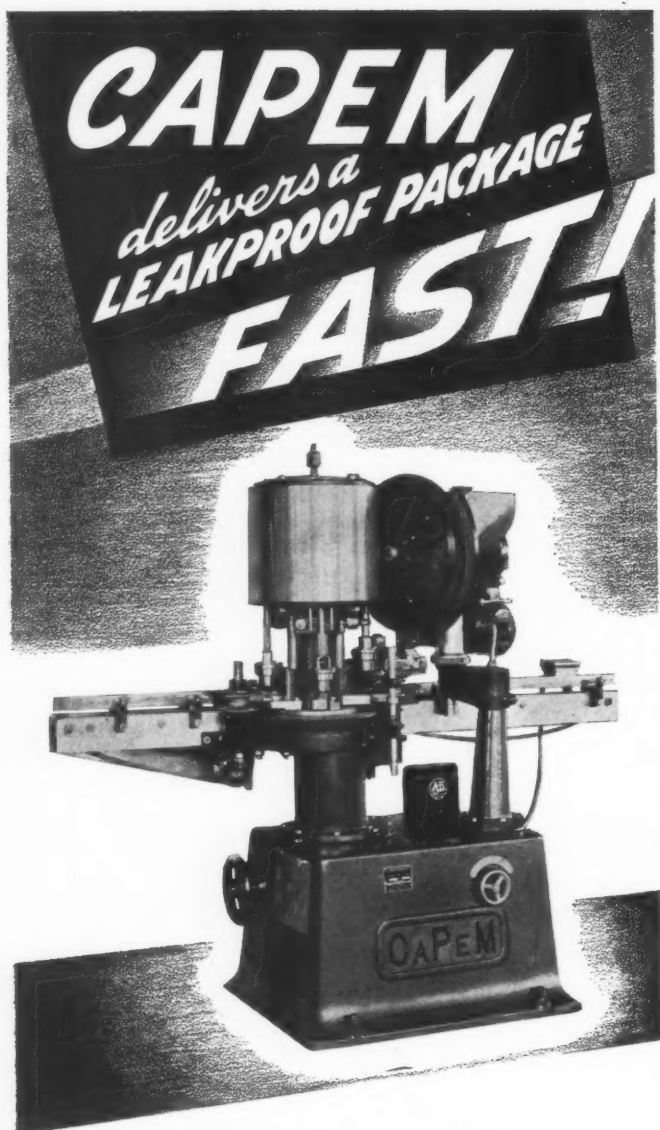
This PETERS JUNIOR CARTON FOLDING AND CLOSING MACHINE closes 30-40 cartons per minute requiring no operator. The cartons enter this machine as open, filled cartons on conveyor belt and leave machine completely closed, ready to be packed for shipment or wrapped. Can also be made adjustable to handle several carton sizes.

If you require repair parts, do not hesitate to order them. We will make prompt shipment without interfering with the large amount of war work we are now doing.

PETERS MACHINERY COMPANY

GENERAL OFFICE AND FACTORY

4700 RAVENSWOOD AVENUE, CHICAGO, ILL.



SEALING problems disappear when a CAPEM screw capping machine goes on the line. CAPEM delivers a tight, leakproof seal with all styles of metal and plastic caps as well as caps of certain acceptable substitute materials. This capper seals bottles, jars or cans of any size or shape at speeds ranging from 2000 to 7500 per hour. Fully automatic, it saves from 2 to 4 operators.

Enlarged facilities enable us to produce more than ever before. Right now all of this equipment is devoted to the war effort. When this crisis is over, however, we hope to utilize these enlarged facilities to build new types of packaging equipment in addition to the standard line of Consolidated packaging machinery.

To this end, we welcome suggestions from users of packaging machinery as to new types of equipment which might help to solve their post-war packaging problems. Such an interchange of ideas will benefit all users of packaging equipment by helping them to plan NOW on ways to meet post-war needs.

**CONSOLIDATED
PACKAGING MACHINERY CORP.**
1400 WEST AVENUE • BUFFALO, N. Y.

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All classified advertisements payable in advance of publication. Rates: \$5.00 up to sixty words; enclosed in border, \$10.00 per inch. Publisher reserves right to accept, reject or censor all classified copy.

WANTED: MANUFACTURERS' AGENTS to represent manufacturer producing new marking device and marking colors, to establish distribution, contact government departments and industrial plants. State your qualifications, lines carried, territory covered and age of establishment. Reply to Floquil Products, Inc., Dept. M-1, 1974 Broadway, N. Y. 23, N. Y.

WANTED

LARGE NATIONAL CONCERN producing packaging material wants three men who are familiar with packaging materials and equipment to serve as packaging engineers. Also one man thoroughly familiar with laminating equipment and laminated materials and fancy papers. Also one man thoroughly experienced in the manufacture and sales development of bags. Write to Box 201, giving experience, age, salary, etc. All replies will be held in strictest confidence.

FOR SALE: Model S Improved Economic World Labeler, motor driven, to place labels $2\frac{3}{8}" \times 5\frac{3}{4}"$ and $2\frac{1}{8}" \times 5\frac{1}{8}"$ on box ends, with general Electric $\frac{1}{2}$ H.P., A.C. Motor, Type R.K.T., 220 Volts, 60 Cycle, 3 Phase, 1725 R.P.M., Snap switch, serial No. 745810. Reasonably priced. Box #199, Modern Packaging.

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HIGH TYPE EXECUTIVE WITH 20 YEARS OF PACKAGING, MERCHANDISING AND FACTORY MANAGEMENT EXPERIENCE IN TWO LARGE WELL-KNOWN CORPORATIONS AS WELL AS FIVE YEARS AS PRESIDENT OF SMALL SUCCESSFUL COMPANY. IS NOW ENGAGED IN WAR WORK, BUT DESIRES PERMANENT EXECUTIVE POSITION SUITABLE TO HIS BACKGROUND AND BROAD EXPERIENCE. BOX 205, MODERN PACKAGING.

PACKAGING ENGINEER, experienced on high speed wrapping machines to maintain continuous production on gum wrapping machines. Excellent opportunity. State age, experience, and salary desired. Write care of Box #198, Modern packaging.

MIDSOUTH BOX PLANT OPPORTUNITY

SET UP AND FOLDING PLANT, annual volume nearly \$500,000. Can double with present equipment. Orders on hand \$125,000. Good mill connections with excellent board allotment. Labor situation best in United States according to Government survey. Not a war plant in city. Real opportunity for Northern or Eastern concern to relieve their present production problems and have an established business for postwar business. Owner wants to retire. Write P. O. Box 1042, Memphis, Tenn.

MAINTENANCE MECHANIC: Experienced on S & S wrapping machines. Excellent starting salary. Plenty of overtime. Good future. Write Mr. O'Brien, SHULTON, INC., 1500 Hudson St., Hoboken, N. J.

WANTED: An experienced Packaging Foreman for Department now employing 35 people. We want a man well versed in small package operation to grow with a new development with a definite post-war outlook. Fine opportunity for an aggressive young man who can handle people. Plant located near Newark, New Jersey. Reply Box 196, Modern Packaging.

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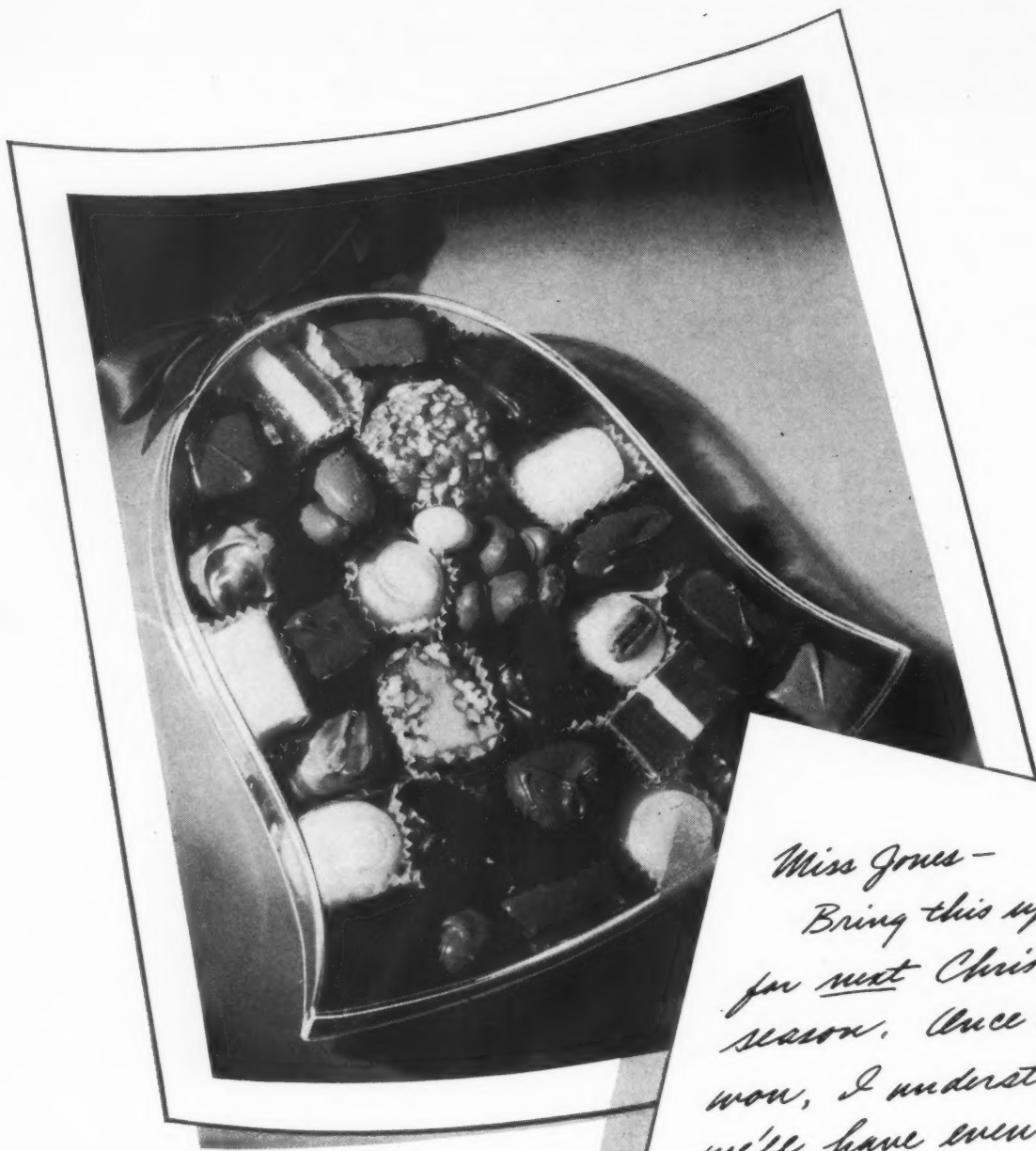
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